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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—31ST YEAR. SYDNEY, SATURDAY, DECEMBER 30, 1944. No. 27.

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The Sir Richard Stawell Oration.[1]

By S. A. SMITH,
Sydney.

SINCE I understand that each of these orations in the memory of Richard Stawell is expected to add pieces to a mosaic, I shall attempt to record the impression made and left on me by an association, cordial but never intimate, which extended over many years.

In the earliest years of this century the young graduate in medicine in Sydney heard of a great man from the south. The name of Stawell had thus early come to be known outside the boundaries of his State. After the first Great War, we in Sydney heard from our fellows who had worked with Stawell in Egypt and Lemnos, and who had met him there for the first time, what manner of man this great physician was. They had been impressed immediately by his ability, his friendliness and the charm of his personality. They told us that his devotion to his soldier patients was such that in times of necessity even the tasks of a hospital orderly were not beneath him. They related incidents which revealed an equanimity and dignity undisturbed by the discourtesies of lesser men.

My own first meeting with Stawell was in 1920, when, as I had to pass through Melbourne frequently to and from Broken Hill, it became a habit to lunch with him at his home, to hear his views on this and that, and particularly to talk of those problems which concerned our studies in industrial health at that time. I found in him a charming host, a discerning critic, and, with outstanding tact, a good listener. Then I realized that in this instance the great man from the south was really great.

This was the beginning to me of a valuable acquaintance, which increased on many occasions during the formation of the Association of Physicians and at the meetings of that body, and ultimately in the first steps towards the foundation of the Royal Australasian College of Physicians. Had he lived, undoubtedly Stawell would have been the first president of this college. It has recorded its debt to him in naming after him the lecture hall at the college building in Sydney, and, through the generosity of its first president, Sir Charles Blackburn, in placing therein a beautiful bas-relief portrait of him in bronze.

His powerful intellectual equipment was, of course, apparent. Without it no man could have risen, as he did, to be the leading physician in Australia. That he owed much to his early devotion to the basic sciences was clear, and he acknowledged the great influence in his formative years of his teachers overseas and of Charles Martin, that great physiologist of vivid personality, whose influence in Australia is still so strong. In 1929 it fell to my lot to request him to address the Section of Medicine at the Australasian Congress of the British Medical Association on the subject of œdema. He regretted that his varied life and interests had for some years interfered with his reading, and that he felt his inability to deal adequately with the pathological physiology involved in this study; but this inability was not obvious to his audience. In fact, it did not exist; but in expressing this feeling, he was influenced obviously by the high standard of knowledge he demanded of himself. To one who reads the personal recollections of him in previous orations in his memory, and who listens to reminiscences of him by his old students, this rigid insistence was characteristic, and the foundation of his success as master and teacher clearly lay in the clarity of his mind and in his ruthless devotion to truth.

An important factor in his career was that he had personality and style. The lean, ascetic face of the scholar, the kindly and penetrating eye of the philosopher, the polish of his diction and the courtesy of his manner (except when the reverse was imperative) are the impressions that remain in the mind of one who came into occasional association with him. And always one remembers that his mode of thought was broad and generous, with something in it which was half humorous or half whimsical. My mind goes back to a luncheon table at which was gathered a party of physicians mostly younger than himself. The discussion turned to the difficulties of diagnosis which all too frequently confront the physician. Stawell, after listening, remarked: "Fortunately I have now reached the position where I can say, 'my dear sir, my dear madam, I am sorry to say that I do not know what is the matter with you'." "And how does it go?" asked an envious junior. "I don't know", said Stawell, "I haven't said it yet."

[1] Delivered at a meeting of the Victorian Branch of the British Medical Association on October 4, 1944, at Melbourne.

The Springs of Medical Progress.

In every age practitioners of the art and science of medicine arise who stand out above their fellows. They are not the product of their age, except in so far as they apply the knowledge of their time. They possess some quality which I have tried to define to myself, so as to recognize some of its components.

There is the capacity for critical evaluation, for a nice balance between a healthy iconoclasm and a controlled imagination. At no time is this of more importance than when there is great activity among the scientists and when the knowledge of the day is to be applied at the bedside. Experience, or rather the faculty of learning from it, is important, of course; but experience teaches different lessons to different people. Those destined for distinction show early the ability to turn it to the best account. Character and industry are also essential; but in all the learned professions, the possession of character is not the prerogative of the few, and great industry is displayed by many who do not reach the heights. Sometimes the effects of a classical education and sometimes a flavour of flamboyancy help; but these are not essential.

These are some of the components of this quality, but I fear I have been unsuccessful in discovering the formula. However, although it is given to few to discover new truths whose contribution to human welfare will be recorded by history, yet greatness in medicine may be achieved by him who brings his abilities to their highest point and whose personality penetrates most deeply the lives and thoughts of those with whom he comes into contact.

With the growth of knowledge, the content of medicine alters, but not its essential method and ideal. Certainly, it is prone to changes due to passing fashion; but such changes are ephemeral, they pass and leave the main body unaltered. Many of the beliefs of today become the superstitions of tomorrow. Just as we look back with some amusement, perhaps some pity, on the practices of our fathers, our sons will do the same to us. Occasionally, however, some development occurs which is not fad or fancy, it is soon added to the substrate and becomes part of the accumulated store of knowledge which forms the basis of medical science. It has been said that every drug, every new therapeutic procedure, even every new health resort requires three years before its worth can be really established; but this applies to the minor things, not to the great additions to knowledge. Minot, Murphy and Castle discovered the cause and treatment of pernicious anæmia, and at once the whole conception of this disease was changed. Fleming and Florey gave us penicillin, and it did not require three years or the work of a statistician to prove that here was no passing fashion. All the great discoveries in medicine reveal their worth at once; but minor additions to knowledge require a longer time before their real value can be established.

But these changes in medicine come from within, they develop from the study of disease by the clinician and from the laboratory of the pathologist, the chemist, the biologist and the physicist. Does medicine change because of the happenings in the world at large? Does it gain anything from contemporary events or does it go on its way uninfluenced by these things? Look for a moment at the past. In the middle ages the physician held his place though he were heretic or alien; the religious and political atmosphere of his time did not affect him. Religions changed, the influence of the monastic orders which supported and fostered the work of the physician was destroyed; yet in the reformation which followed, he held his place. He concerned himself then, among other things, with the prevention of epidemics among the people rather than with the upheavals which surrounded him. In later ages he carried on, unaffected by the political turmoil of the times, and may we hope piously that this will always continue. It is often said that war provides great additions to medical knowledge. Undoubtedly it is a great stimulus to the use and perfecting of new methods. It gives opportunities, not available in times of peace, for mass trial of new remedies and techniques; but it is doubtful whether directly or indirectly it leads to fundamental discoveries. As Florey pointed out in one of his lectures, the development of penicillin was not due to the influence of this war. He and his team at Oxford did not sit down and rack their brains for a new substance to help their country. But the campaigns in North Africa and Normandy gave remarkable opportunities for testing its efficacy and establishing the techniques for its use. It is difficult to say whether seeds have been planted in this war whose fruit will be garnered in later years, but in the light of past experience it is unlikely. Great discovery springs from other sources than a fight for national existence. In medicine, necessity is not the mother of invention.

Apart from religious and political events, medicine influences the arts rather than is influenced by them. In our own times, the underlying ferment of the world which produced the two great wars and the restless, troubled interval between them, found expression in remarkable changes in the arts. There is much of modern painting, architecture, music and poetry which I do not understand. Therefore I cannot criticize it, much less laugh at it, but it does not seem that medicine has been influenced by it. On the contrary, a case can be made out that the school of medical thought which was originated by Freud and carried on by his followers has profoundly influenced many a modern painter, poet and composer. The contributions of Freud and his school have been of immense value to medical science; but just as there are many wise men who think that the Freudian concepts with all their brilliance and persuasiveness have been pushed sometimes to a point where they make too great a demand on our credulity, so there are many who stand astonished, amused or angry at those examples of modern art, comparable to the distorted dreams of a pathologist, which may be attributed to this influence. The "explosive pelvis" of that great modern, Ern Malley, is not without some significance here.

But to the mind of the ordinary man (whatever that may mean) the trend in that part of modern art which he can understand (sometimes very dimly) is in the direction of a more social outlook. The modern poet, for example, has turned his back on formal tradition. Now he does not leave life and mankind out of it all; he has gusto, he is unpretentious, he reads newspapers, he is interested in men, jokes, science and politics as well as in mere sensations. His has become a more social outlook, and it may be that medicine, always inherently social in its aim, has become more consciously so in the last decade. But it has influenced art rather than been influenced by it.

There are some who contend that the politics of our time are in fact influencing the path of medicine and that the doctor is being forced out of his old tracks by the politician. There are still people so negligent of the teachings of history, and so blind to the obvious facts, as to make the foolish statement that the doctor has a vested interest in disease and suffering. The only persons in our community who have such a vested interest are the "quack" and the charlatan. The most superficial knowledge of history shows that the medical man has always been the first to foster a respect for the value of human life, to revolt against the toleration of unnecessary suffering and to recognize the importance of happiness to health. Encouragement of the "quack" and the charlatan is a concession to human frailty and ignorance. This is, I presume, the reason why in the regulations of *The Medical Practitioner's Act*, 1938-1939, the kind-hearted New South Wales legislature has provided the unregistered practitioner with the most liberal sanctions to compensate him for his incompetence.

Medicine in the Last Ten Years.

Having satisfied ourselves that medical progress comes only from the additions to knowledge contributed by the studies of the clinicians and the scientists in the laboratory, and not from the activities of the politician or artist, let us turn to survey some of the outstanding additions that have been made in the ten years which have elapsed since the death of Stawell. It has been an exciting decade, since in that time we have seen the synthesis of the vitamins, the extension of our knowledge of the virus diseases and of the hormones and the rise of chemotherapy with the introduction of the sulphonamides and penicillin.

In any decade, the outstanding achievements in science are usually the flowering from seeds planted many years before. Good fortune may attend discovery, but it comes only to the mind that is prepared for it.

The synthesis of the vitamins covers a long series of brilliant and imaginative investigations. It was discovered in 1757 that scurvy arose from the lack of fresh elements in the food of sailors; but the lesson of scurvy had been long forgotten when the modern study of nutrition began. This started shortly after the beginning of this century, in the discovery by Frederick Hopkins Gowland of the accessory food factors, called generically the vitamins. It opened up a new territory, in that it showed that the caloric value of food was not the all-inclusive necessity, but that minute quantities of one or other accessory substances were necessary for complete health. The name "vitamin" was introduced before the chemical nature and structure of these substances was known. Research was encouraged by the conditions of the food shortage in Europe during and after the war of 1914-1918, but at the beginning of the last decade, the chemical identification of only one vitamin (the anti-rhachitic vitamin *D*) had been made. Now the identification of the chemical structure and the synthesis of most of the remaining known members of this group have been achieved. This has been a great advance in our knowledge of these things without which life and health are impossible, and it has altered the outlook of many aspects of disease. There seems little doubt that the future holds hope of further discovery in this field.

As with all new knowledge applied to the maladies of man, extravagant claims for the value of these substances have been made, particularly by those with a commercial interest in their sale. But the effect on clinical medicine has been far-reaching, especially in its application to the study of the needs of the health of the nation, since this knowledge has shown what is necessary for proper nutrition and proper protection and how such necessities can be provided. It has also brought to light that in addition to those vitamin deficiencies, such a scurvy, pellagra, rickets *et cetera*, whose outlines are so clear, there exist a host of not so easily recognizable, but none the less important, deficiencies which play a part in the phenomena of disease. Without technicalities and the polysyllabic language of the biochemist, it is established that for the good health of the nation every citizen should have a bounteous supply of fresh butter, green vegetables, fresh eggs and milk, so that his food will contain all the vitamin and mineral constituents which are necessary. At first sight, it may seem unnecessary to underline this simple result, especially in a country like Australia, where food is plentiful and good; but even before 1938 deficiencies were known to exist, and since then the impact of war has brought such matters into the front of our thought. At any rate, these facts are a contribution of the last few years to that knowledge which should inform the activities of those in whose hands the provision and distribution of the nation's food lie.

It has been suggested that now that the biochemist has taught us the necessary chemical constitution of good food (indeed, synthetic beef is a common-place), his next job should be to make it palatable. He should produce thousands of new and cheap synthetic flavours as substitutes for the limited range of natural ones which are now available, just as he has in the past produced thousands of synthetic dyes from coal tar as substitutes for the few natural colours which we possessed previously. Then, according to Hogben, "the difference between the quantity and variety of food consumed by the richer and poorer sections of contemporary society might be less conspicuous than the difference in the quality of the conversation which accompanies its consumption".

Talking of the vitamins inevitably brings to mind the hormones. Both vitamins and hormones are substances very small quantities of which are necessary to life. Vitamins, however, are externally produced, while hormones are manufactured by the body itself. Their recognition dates back to 1902, and our knowledge of them predated that of the vitamins. But in the last ten years two great advances came from the recognition of the pituitary hormones and their overriding and coordinating role and from the romantic discovery of the chemical structure of the sex hormones and their close affinity to other sterol derivatives, notably vitamin *D* and cancer-producing substances isolated from coal tar. Both of these discoveries are steadily working their way into clinical medicine and therapeutics.

This ten-year period also has seen the rise of the virus diseases. I suspect that this phrase is not quite correct; but in this time a number of new diseases apparently have arisen, and many others well known and common have been proved to be due to virus infection. For example, such diseases as influenza, infantile paralysis, smallpox, chickenpox, mumps, dengue, herpes of various kinds, warts and some forms of encephalitis, measles, and last but not least the common cold, are in this list. It is not within my capacity to say anything about the nature of the viruses, whether occurring in humans, animals or plants, or to express an opinion as to whether these ultra-microscopic border-line entities are animate or inanimate particles. But that they are infective, that a virus never arises from a non-viral source, that they may be carried by a large variety of animal vectors, that they are transmitted from one host to another by diverse and complex means, and that they travel within the animal host, variously through blood, nerves or lymph according to the kind of virus, is definitely known. It is also recognized that virus diseases may be generalized or local, that they may be accompanied by the severest toxæmia or by no other clinical effects than a small local affection of the skin, and that there are even "inapparent infections". Activity in the investigation of these infections is a characteristic of this decade. Some of the most distinguished work has been done in this city by Dr. Burnet and his fellow-workers at the Walter and Eliza Hall Institute. Although many of the virus diseases have been known for many years, "new" ones have lately been recognized, many of which are transmitted to man from an extraordinarily wide range of animal hosts, from the larger quadrupeds down to the smallest insects and birds. It is always difficult to determine whether a disease is in truth a "new" one. Disease is never static, and the relationship between host and parasite is constantly changing. Diseases which, as history tells, were once acute and likely to be rapidly fatal, may become relatively mild and chronic as years pass, the relationship between the host and parasite changing from one of complete incompatibility to one which is almost amicable. We see this in studying the effects of tuberculosis and measles on the virgin soil of native peoples who have not previously been exposed to infection, and the change which history shows the years have wrought in the virulence of diseases like syphilis. Even in our time scarlet fever has changed from a severe to a relatively mild malady. But these changes raise no diagnostic difficulty; the nature of the disease is still recognizable. However increased or diminished its virulence, however changed its course, the disease is the same. The "new" diseases have their own distinctive characteristics in their manner of onset, their clinical signs and symptoms and sometimes in the reactions observed in the laboratory by the pathologist and biochemist. The paucity of diagnostic aids and the less precise nomenclature of earlier times render the task of the historian difficult when he seeks to identify some of these conditions with those reported in the past. In some instances, as, for example, in the nervous system, research has shown that some virus diseases called "new" are not so in reality; but this is not true of all. It appears, however, that some really new diseases of virus origin, especially of the nervous system, have made their appearance in the last few years.

It has been suggested that the infection of man by parasites well established in types of animals and insects to which he was not previously exposed is the explanation of these facts; but it is hard to believe that the psittacosis of birds, the encephalitis of horses and the louping-ill of sheep have not previously infected man only from lack of opportunity. Yet it must be admitted that the relatively

great frequency with which some of these diseases have infected workers in the laboratory is a striking fact. There is no doubt that the imaginative research into these questions is an outstanding feature of the last decade, and that the proper understanding of virus diseases is essential for the future well-being of mankind.

But the most striking event in this decade has been the rise of chemotherapy. Since 1878, when Pasteur propounded his general theory that infectious and contagious diseases were produced by microorganisms, it has been the dream of clinicians that means would be evolved to produce or heighten resistance to disease, or to attack directly the infecting microorganism which had overcome the powers of resistance of the body, by some substance which would kill it or at least render its growth impossible, without injuring or destroying the tissues of the human host. Those who dreamed of one universal germ-killer fatal to every microorganism—a panacea—were indulging in the fantasies of the alchemist. A belief in alchemy seems to have been carried down from the middle ages to this twentieth century in the minds of some newspaper readers, of drug manufacturers of the lesser sort and of charlatans with strong commercial instincts. But it must be confessed that the recent advances have encouraged the most cautious to hope that the ideal germ destroyers are in the offing.

The earliest examples of drugs with specific powers were entirely empirical discoveries. Peruvian bark, introduced by the Portuguese after the discovery of the New World, yielded quinine, a specific for the treatment of malaria, inimical to the parasite but relatively innocuous to the patient. It was probably the first of the specific therapeutic agents to be used in medicine, and such was its efficacy in this respect that it deluded many an amateur to imagine that it was a specific for colds and influenza in spite of overpowering evidence to the contrary.

The search for specifics, encouraged by enlightened representatives of the drug industry, led, in 1909, to the discovery by Ehrlich of the organic arsenic compounds, "Salvarsan" and its successors, for the treatment of syphilis and a few other diseases, tropical and otherwise. This was the first outstanding success in the field of synthetic chemotherapy, and it raised high hopes of future development along similar lines. However, as has so often happened in the past history of medicine, a period of a quarter of a century elapsed before further discoveries were made.

In 1935, in the year of Stawell's death, the first sulphonamide drug, "Prontosil", was introduced, and this was followed in succession by many others. Their discovery and elaboration were a remarkable example of planned research, and made, up to that time, the greatest stride in the treatment of infectious disease.

What are the ideal qualities of a chemotherapeutic agent? It must be (i) effective against a wide range of infecting organisms, (ii) capable of production as a stable product, preferably by synthesis, (iii) capable of rapid absorption into all tissues and fluids, (iv) not subject to such changes in the body as will render it even partially inert, (v) slowly excreted, so that its concentration in the tissues may be easily and comfortably maintained, (vi) usable locally in all conditions of infections of wounds *et cetera*, and (vii) free of poisonous effects on the human host. It is too much at present to hope for a panacea which will lead to the destruction of all types of infective agents, bacterial, rickettsial and virus.

The sulphonamides had a remarkable effect on the mortality, duration and severity of common dangerous diseases, such as pneumonia, meningitis, gonorrhœa and many others. Their introduction revolutionized therapeutics; but it is not captious to say that they fall short of the ideal, mainly because, though leading to inhibition of the growth of the germs, their use cannot be continued for a long time (even sometimes for a short time) without the occurrence of damage to the patient.

As the result of further research in the field of chemotherapy, however, the discovery of penicillin stands out as by far the greatest achievement. This product of mould growth discovered by Fleming in 1929, and separated, developed and established by Florey from 1938 onwards, is the most valuable single therapeutic agent yet known. Those who listened to Sir Howard Florey's account of the work of the Oxford team under his inspired direction were privileged to have a close-up view of scientific research methods and to hear the most authoritative evaluation of the properties of this substance. In the absence of toxic effects on living human tissue, in the width of its range and in its local effectiveness even in the presence of pus, it has carried us a long way nearer to the ideal.

Within the last ten years, therefore, there have been introduced potent therapeutic agents which so interfere with the growth of many types of organisms that cause common and menacing diseases, that the human body is able to overcome them with a rapidity and to a degree hitherto impossible. There still remains a number of common bacterial and virus diseases against which no therapeusis is effective. Here is a field for the future.

Other problems in infective diseases remain. In the test tube and in the human body some strains of microorganisms originally susceptible to the sulphonamides have become resistant or sulphonamide-fast. Possibly such phenomena will be observed to follow the use of penicillin in the human body.

Nature is persistent, she does not take defeat easily; frustrated along one path, she returns to the attack along others. Will the future see the development of altered races of organisms, which will flourish because they have become resistant to the therapeutic attack of today? And will organisms such as viruses, which are not susceptible to the action of sulphonamides and penicillin, increase their menace to human health? Not being able to throw light on the future, I do not know the answer to these gloomy questions; but it is obvious that medical science and research must use to the utmost their knowledge of the means to prevent disease, as well as of the agents to conquer it when it has developed.

Medicine in the Next Ten Years.

I wish that I were able to foresee the advances in the next ten years, but the mantle of the prophet is not upon me. The physician seeks to avoid it, although there are many who all too frequently attempt to cast it upon him. While pondering on this I had the visitation of a dream. Let me say at once that it was not such a dream as the most ardent post-Freudian could misinterpret with all his unpleasant ingenuity. I dreamt that I was approached by a public man in high places in a country not far from Australia, who told me that for the next ten years he would have the power and support that come from a pliant majority in both houses of parliament. In that time it was his ambition that he would legislate and organize so that every child born in his country would be assured of the highest degree of health that science and a beneficent government could offer. At this point I realized that I was talking to a statesman. He told me further that he had excellent expert advisers on the public health, and that already much had been done in his country for the future. He had been supplied with reports and plans, pink papers and blue-prints. He realized that—to quote from one of his reports—"in the present need, the growing child is the most important national asset, and, whatever he might do administratively and however large the sums of money he spent officially, the environment and economic status of the individual is, in the last instance, the determinant factor in health". But, while having the utmost respect for his experts, he wished to have the opinion and advice of one who was just a doctor, one who had been occupied for a good number of years in the treatment of sick people. Although my statesman had a great majority in the parliament, the income from taxes was not inexhaustible, and he had a vigilant treasurer who was one of those demoded creatures who was actuated by the "profit motive", in that he insisted that the taxpayers' money must be spent to return the highest possible dividends. Nonplussed for the moment, and unable to marshal my thoughts, I awoke from my dream and the statesman had vanished. But the questions remained, and how were they to be answered?

Many years ago Galton had the same aim, and set out to found a science to "study these agencies under social control which may improve or repair the racial qualities of future generations". His science of eugenics did not flourish, because it was based on scientific fallacy and was to become the hunting-ground of prejudice, intolerance and snobbery. Yet it is clear that our statesman, to achieve his ambition, must start with the genes. Although it is undeniable that no external agency can alter truly ingrained genetic characters, there are few of these which are not susceptible to the effects of environment. For our statesman, nurture, not nature, is the important thing. By no legislative act can he influence stature, hair characters or eye colour; but he would not wish to, as they are unimportant. Nor can he ensure a population free from the feeble-minded, the albino, the colour-blind, and those with some rare disease or deformities of the nervous system or limbs. Of these the feeble-minded only are important in a national sense. Although this condition is incurable once the individual is born, many countries have tried by sterilization and segregation to mitigate its suffering and prevent its transmission. Denmark, Norway, Sweden, Switzerland and California have adopted these methods; but we must await results. Knowledge is hard to come by when one is dealing with man, whose life history is so long.

But environment is a complement of heredity in the formation of the individual, although at times it is difficult to apportion accurately the role it plays. Galton himself wrote that "man is so educable an animal that it is difficult to distinguish between that part of his character which has been acquired through education and that which was in the ordinary grain of his constitution".

The term "environment" has a wide meaning, as it includes the physical, chemical and social factors which operate on the individual from the moment it starts its own existence. At the time of birth, a human being has already completed about nine months of his existence as a separate individual, and has been for that time subject to the influences of environment in some of the most formative stages of development. It is here therefore, on the health of the mother, that our statesman must make his start. The foundations of health in every citizen are laid down in the period of intrauterine life, and as growth and development come from the maternal blood, the health of the mother should be the most important consideration of the State. He who ensures healthy children at birth and healthy mothers to carry on the race, does more for his citizens than can be achieved by the most devoted and lavish attention to the sick. Harvey Sutton has concluded that one in every six conceptions may be expected to produce "damaged goods". This is somewhat conjectural; but the estimate has been made after analysis of the statistics in New South Wales. If this is approximately correct, there must be an appreciable proportion of children who enter on their lives in the world handicapped in their powers of resistance against disease. Much has been done in enlightened countries in the care of the expectant mother, so far as the causes of the mortality and morbidity of mothers and children in this period are known, and it is obviously the obligation of the statesman to establish and support to the utmost agencies for proper care and advice during pregnancy, the early treatment of "emergencies", the encouragement of blood banks and good obstetrics, and the education that leads to it. These should be provided in every part of the country. There are still questions of maternal health, especially those concerining the toxæmias, which remain unanswered. In this field research must be liberally encouraged. But the prevention of maternal mortality and the preservation of maternal health by these means are subsidiary in many ways to the provision of three things. It is the duty of the State to ensure the supply of proper food, to encourage proper housing and to provide the opportunities for rest.

Provision of the right food for every expectant mother in the community is an obligation. Many women live ordinarily on the threshold of nutritional deficiency, and therefore during pregnancy need something much better than their ordinary diet. The child has priority over the mother in respect to certain supplies, notably calcium. Therefore the mother must consume bounteous quantities of milk. The statesman who ensures that every expectant mother has the necessary supply of milk, supplied free if necessary, may be sure that the expenditure of public funds to this end will return immeasurably greater dividends than the free provision of any other bottled fluid. And the provision of those other foods—proteins, fresh eggs and green vegetables—to supply the balanced, full diet which the increased demands require, is an activity whose benefits warrant the most liberal expenditure of the taxppapyers' money in a country whose aim is the highest level of health.

Another avenue through which the health of the mother, and indeed of everybody, can be improved, is proper housing. Our statesman has ten years in which to provide this. Here is a great opportunity to provide sunlight, rest and happiness for his citizens, because these are necessary to all. By enlightened planning there can be provided at modest rentals, suitable for the predominant part of the population and almost in the heart of great cities, housing that affords comfortable homes, with modern labour-saving devices. On areas where 25% only of the land is occupied by buildings, every living room can have direct sunlight, the rest of the land being given over to parks, to playgrounds for toddlers and for older children, and to quiet, safe roads—and all this without the depressing effect of monotonous repetitive and barrack-like structures.

This is no idealistic vision, because already it has been achieved in England and in the United States of America. What part should the State play in this? The model is supplied by the cities of New York, Washington, San Francisco and others which, recognizing the national character of such projects, have helped to make areas available and have encouraged those private and mutual cooperative bodies whose vision and knowledge have made them most qualified to carry out such schemes.

The young citizen and his mother must have before and after birth the healthy environment which is not possible unless the mother has the regular relief of rest. Especially is this so when there are other children in the family. No sentient man can practise medicine without recognizing that the absence of regular rest and relaxation is one of the most important factors in the ill health of women, and through them, in the ill health, physical and mental, of their children.

The State everywhere in these days recognizes the special value of organizations which provide a home-nursing service and home aids.

> This enlistment of organized aid for assisting women with their domestic responsibilities might well be developed on a local basis, analogous to the many organizations now created for patriotic purposes. This is a service which women themselves can inspire, inaugurate and organize, but the Government should generously support and provide such funds as are necessary to stabilize responsible organizations on an acceptable basis.

This is a quotation from a report of the Parliamentary Joint Committee on Social Security, and the degree to which these things are removed from pious expressions on paper to working realities will be the measure of statesmanship.

When the citizen enters on his existence in the brave new world, he is beset by further dangers, physical and mental. The prevention of physical ailments is a work whose main purpose and method are well recognized, and administrative policy and action are dealing with it more adequately every year. The incidence of the two most dangerous diseases for the infant—enteritis and bronchitis—has been materially reduced by mothercraft care and education, and by better housing and sanitation.

Slightly later, the infections threaten. So far, science can provide absolute protection against two only of those prevalent in Australia—diphtheria and whooping cough. The universal practice of immunization against these two common enemies will eliminate both as considerable factors in child mortality and morbidity. In Sydney diph-

theria is still a dangerous disease for young children, but it has practically disappeared from Toronto. Education on these matters has had better effects in Canada than in Australia. The fault here lies mainly with the people.

As to the other infections, the resistance which has been built up by proper food and environment, fortified by the acquired immunity which comes from regulated contact with others, must suffice. The child may surmount the dangers of the infections, he may escape (or have corrected) his physical faults and deformities, and he may be prevented from falling out of the window; but he is still beset by dangers in this early period of life, because it is the time in which the first development of the mind and spirit occurs. Here is another opportunity for our statesman. The influences which mould the child are his family and his companions. If these are wrong, the seeds of unhappiness and illness will be sown. It is in this period that the foundations of many of the neuroses of later life are laid. A large proportion of those unhappy people who crowd the consulting rooms of the doctor are suffering only from disturbances of the nervous system, which can frequently be traced back to the wrong environment of these early years. "But", you will ask, "can the statesman make wise parents?" And you will answer at first blush that of course he cannot—this is asking too much of him. But further thought indicates that he can do a great deal.

At the present time the task of caring for the development of the pre-school child is undertaken, as well as by the family, by the day nursery, the nursery school, the kindergarten and the child-guidance clinic. In practice the child-guidance clinic is as much a parent-guidance clinic as anything else. But these clinics are not coordinated—they are woefully inadequate and they lack proper facilities.

Our statesman would do well for his country if he spent the public money liberally (not in relatively insignificant amounts, as some of his neighbours have done) in the education of trained personnel for the task, in the provision of suitable buildings and equipment, and in the coordination of those public and private bodies in whose hands the future welfare of the child lies. In doing this he need have no fear that he will interfere with the unity of the family. He will, indeed, relieve some of the strains to which the family, particularly the mother, is subjected. He will not enable parents to escape responsibility, but he should make that responsibility more apparent and easier to discharge. And thus, slowly it may be, the statesman may gradually produce wiser parents. Let him not despair of achieving this; let him not be influenced by gloomy bishops in this matter; let him organize wisely and spend liberally, and he will earn magnificent national dividends.

Throughout these thoughts there runs the thread of education. The education of the doctor is the simplest part. He is one of the most educable people in any community. A few days ago in this city Sir Alan Newton, President of the Royal Australasian College of Surgeons, spoke eloquently of the obligation of the State to establish research activities on a wide basis and liberal scale, and to retain the best minds for their conduct. I can support his claim, and underline the fact that research is the most powerful influence in the education of the doctor. It creates an atmosphere which spreads out in wide circles from the laboratory and the clinic until it surrounds every man concerned with the prevention and treatment of disease. It is the great, invigorating force through which science renews its strength day by day.

More thorny is the problem of the education of the people—the mothers, the fathers and all the rest. Let us not be pessimistic about this. As Freud has said:

> We may insist as often as we please that the human intellect is powerless when compared with the impulse of man and we may be right in what we say. All the same, there is something peculiar about this weakness. The voice of the intellect is soft and low, but it is persistent and continues until it has secured a hearing. After what may be countless repetitions, it does get a hearing. This is one of the few facts which may help to make us rather more hopeful about the future of mankind.

Reports of Cases.

MYOMA AND PREGNANCY: AN UNUSUAL COMPLICATION.

By IRVING BUZZARD,
Warrnambool, Victoria.

Clinical Record.

MRS. F., aged thirty-six years, a *primipara*, was due to be confined on November 15, 1944. On September 5 she complained of a "lump" on her abdominal wall which seemed to grow larger when she was lying down and was causing pain. She had noticed it for the last three weeks, and it had increased in size. The previous antenatal examination was made on August 7, and no such tumour was then noticed.

Examination revealed an approximately circular lump about two inches in diameter, situated in the mid-line just above the umbilicus. It was movable and subcutaneous, but felt hard; it was not cystic. The tumour was certainly not a hernia of the bowel and did not feel like a hernia of the omentum; it could not be replaced into the peritoneal cavity. The supposed pain and variation in size were evidently due to the movements of the child underneath.

Under local anæsthesia I made an incision in the mid-line and found that the tumour was a pedunculated myoma of the uterus which had herniated through the *linea alba*. It could not be replaced through the opening in the *linea alba*. The myoma was resected and the abdominal wall sutured together again.

Comment.

The case, to my mind, is of interest in that the tumour actually "buttonholed" the uterus to the abdominal wall. If the patient had been left to go to term, the tumour would have interfered with the retraction and involution of the uterus after delivery.

Notes on Books, Current Journals and New Appliances.

PUBLISHING IN PEACE AND WAR.

THIS pamphlet by Stanley Unwin was, according to a footnote, "Delivered, in abridged form, as a 'Discourse' to the Royal Institution".[1] It describes briefly the whole process of book publishing from the receipt of typescript to the time when a book is on sale in the bookshops. To the serious reader intent on learning the numerous processes involved, this work should serve as a reliable guide to further inquiry and study. A description of paper rationing in wartime England and associated difficulties show an interesting parallel to those experienced by Australian publishers.

Notes on "The Future of English Books on the Continent after the War" and "The Status of Books" complete a generally interesting publication.

WHY SINGAPORE FELL.

THE grim tidings that came to Australians in the days between the commencement of the campaign in Malaya and the fall of Singapore startled them to a full realization of the danger that was threatening their country from the north. The reasons for the failure of the campaign, reasons that every Australian should know, are examined by Lieutenant-General H. Gordon Bennett in his book "Why Singapore Fell".[2] Much will have to be written on the subject before it will be possible to piece the whole picture together, and the fall of Singapore will be a matter for controversy for many years. However, the author's calm analysis and blunt criticism of the manner in which the campaign was conducted, are convincing and make an absorbing story.

[1] "Publishing in Peace and War: With Some Notes on 'The Future of English Books on the Continent after the War' and 'The Status of Books'", by Stanley Unwin; 1944. London: George Allen and Unwin Limited. 7½" × 5", pp. 40. Price: 6d. net.

[2] "Why Singapore Fell", by Lieutenant-General H. Gordon Bennett; 1944. Sydney: Angus and Robertson Limited. 8½" × 5½", pp. 273, with illustrations. Price: 12s.

The Medical Journal of Australia

SATURDAY, DECEMBER 30, 1944.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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THE ABUSE OF REST.

DOCTORS have always been a fair target for the arrows of the humourist. A modern wit has described the simple therapy of a doctor whose chief asset was a quiet manner. This practitioner sent his patients to bed and told them to keep very quiet, feeling secure in the belief that on this régime they would either quietly get better or quietly die. There is a real barb in this jest, for the more physiologically minded doctor now turns the light of inquiry on the use of rest and regards it as a weapon, potent, needing intelligent use, and not without its hazards. John Hilton, by his classical "Lectures on Rest and Pain", exerted a considerable influence on current thought, for he stressed the value of simple physiological rest as opposed to methods less discreet or more meddlesome. At the same time he pointed out clearly that by rest he did not mean inaction. "All viscera", he remarked, and meaning thereby more than the thoracic and abdominal organs, "require the alternate condition of activity and rest to keep them vigorous and in health".

The Section on Experimental Medicine and Therapeutics at the recent annual session of the American Medical Association selected a most useful subject for a symposium, "The Abuse of Rest in the Treatment of Disease".[1] During the last generation there has been a tendency to adopt a more liberal attitude in this problem of the degree of rest desirable in the treatment of various types of illness, and this symposium encourages a thoughtful study of the whole position. William Dock, in writing of the evil sequelæ of complete bed rest, points out that such an environment is quite abnormal. The dorsal decubitus is, as he truly says, in itself unnatural. Lowering of muscular tone and metabolism occurs during complete rest, vascular activity is often dangerously reduced and the risks of pulmonary congestion, of venous thrombosis and of embolism are enhanced. Dock also shows that the demands of bodily hygiene expose the patient in bed to conditions which are not only opposed to rest, but which also impose periodical hazards of unusual strain. That complete bed rest may be necessary to obtain physiological rest of a part or system is, of course, obvious, but of itself it is unphysiological, should be ordered only for special indications and should be discontinued as early as possible. The special fields of surgery, orthopædics, obstetrics, cardio-vascular disease and psychiatry are covered by other writers. J. H. Powers presents reports on a series of 100 consecutive patients coming to the general surgeon for major surgical procedures, who were allowed to sit in a chair and to walk the first day after the operation. He contrasts these with a control series of 100 patients treated along the usual more conservative lines. The average age of the former patients was 43·4 years, and of the latter 38·2 years. In general no significant complications occurred in the former group, which included 39 patients submitted to herniorrhaphy. Among these latter no recurrences have been seen up to date. Power, of course, supports the universal belief that early activity reduces the risk of vascular thromboses, but he admits that caution is needed in allowing any actual walking when any risk of thrombosis exists. He believes that the influence of the more radical surgeons in this matter of early discontinuance of full bed rest has been salutary and has led to a speedier restoration to normal life. Ralph K. Ghormley extols the influence of Hilton and Thomas in securing adequate rest for patients undergoing orthopædic procedures, but he points out that today active methods are employed over a much wider field in his specialty. A more enlightened and mechanically and physiologically sound study of industrial surgery has no doubt had its influence. Ghormley lays emphasis on the seriousness of atrophy, so potent a source of delayed restoration of function in traumatic states, in the arthritides, in poliomyelitis and in many other conditions. Special methods such as those used for fixation of the fractured neck of the femur or the spine are, as he points out, important not merely in themselves, but also in their influence on surgical thought.

Nicholas J. Eastman avoids the obvious in his handling of rest in obstetrics. He deals with the question of activity and work during pregnancy and speaks of the work done by bodies such as the Women's Bureau of the United States Department of Labour and the Committee on Health of Women in Industry of the Section on Obstetrics and Gynecology of the American Medical Association. The safeguards adopted for pregnant workers in industry have been proved of value, but in addition, experiences both in this war and in the last have shown that employment under good conditions is quite safe. Eastman's other thesis concerns the spacing of births. This form of rest he regards as capable of abuse, for the advantage gained by a rest between the birth of children may be offset by the factor of aging of the mother. As he rightly says, "the most important talisman which a childbearing woman can possess is youth". The article contributed by

[1] *The Journal of the American Medical Association*, August 19, 1944.

the chairman, Tinsley R. Harrison, deals with some arresting and perhaps controversial aspects of cardio-vascular disease. He interestingly refers to the father of modern cardiology, Sir James Mackenzie, who was proved to have survived several cardiac infarcts for seventeen years, though he never spent more than a few days in bed at a time, and who, true to tradition, played golf until rebellious nature after fifteen years forced him to desist. Harrison himself has followed the lead of other European clinicians and has allowed patients with congestive failure to sit in chairs and even to walk a little. He further refers to work done by Thomas and himself on rats among which the mortality rate following experimentally produced myocardial injury was increased by undue restriction of the animals. During the discussion the work of Sutton on dogs was referred to, and it was pointed out that while abstention from exertion in these animals for six days limited the stretching of the scar in the heart produced by ligation of a coronary vessel, longer periods of rest proved of no additional advantage. Harrison believes that no more than two to three weeks' recumbency should be prescribed after the more acute and alarming symptoms of myocardial infarction have subsided.

Finally, Karl Menninger speaks for psychiatrists. He amusingly refers to Weir Mitchell and says that it is significant that a man of such prodigious labours should have elevated to such fame a system of treatment by rest. He admits that many psychiatric patients are very fatigable, but draws the analogy of the motor car with binding brakes: it is the duty of the doctor to find out why the brakes are not released and how they many be safely freed. It is often wrong to order the patient more rest; on the contrary he may rather need the diversion of his inner energy, that self-aggressiveness which may be wrecking him, and of which one outward symbol is fatigue.

These considerations arouse several reflections. Not only is it just that we should cultivate a truly physiological outlook in prescribing rest, but we must admit that a natural method must not be applied in an unnatural way or for an unusual time without real necessity. Bed rest should never be merely a means of disposal of that awkward body, the patient. Rest should be seriously regarded as a medical prescription which may be life saving, but which has its hazards, just like a surgical operation or a toxic drug, and which like the latter, should not be given in excessive doses. Finally, it is not possible to walk into the wards of a modern general hospital without feeling how wrong the system is which immures the acutely ill and the convalescent within the same walls. It is not merely that the convalescing patient can do little in hospital save sit about or walk cautiously over polished floors. It is not merely that it is uneconomic to retain in highly expensive institutions designed for complex investigation and technical treatment patients who need only attention of a simpler kind, though this is serious and important. From the recovering patients' point of view it is even more important that they should be transferred early from "acute" hospitals, where it is difficult to resist the danger of keeping them too long in bed, to "subacute" hospitals, whose need is so well known. In this way discreet activity could be better encouraged, and that end hastened which is the goal of all treatment, the return of the sick to an active and fruitful life.

Current Comment.

THYREOTOXICOSIS.

THERE can be no doubt that improvements in the diagnosis and treatment of thyreotoxicosis have restored many patients to an active life. Therefore it is of increasing interest to study the inception of the disease, its natural history and its effect on the after life of the recovered patient. Reginald Fitz, having become interested in periodic health examinations, has put together his observations on 33 patients with hyperthyreoidism who have been followed for a number of years.[1] He rightly points out that the periodic health examination may be made a weapon of research. In this case, though his series of patients is small, he has attempted to give an account of the effect of thyreotoxicosis on their lives. First he asks the question whether the disease is prone to attack certain types of individuals or whether it may attack anyone. In his own experience Fitz doubts the existence of a "Graves' constitution", though hereditary factors may be of significance, and his views are of interest because he know all his patients very well, both before and after their thyreotoxic state had become manifest. The earliest symptoms observed were a combination of nervousness, in a vague and general sense, with cardio-vascular disturbances such as breathlessness and palpitation. Fitz agrees with the generally held view that hyperthyreoidism is difficult to recognize in its early stages, because the stimulation of metabolism at first may give rise to a misleading euphoria and eutonia.

It is interesting to read of the first recognized traces of this curious metabolic disturbance in a series of closely observed patients, but what is probably of more interest is an assessment of the results of treatment. The definition of "cure", as Fitz remarks, is debatable, for it may be necessary to follow the whole life history of each individual in a series. Two of the possible troublesome sequels of even the most skilfully carried out treatment are myxœdema and recurrent hypothyreoidism, and these may appear only after a variable interval of time. Further, other writers have pointed out that there may be residual changes in personality which are regarded by some as evidences of a part of the syndrome which may be more enduring than the curious and dangerous metabolic efflorescence. Fitz has been able to follow 28 of his 33 patients for ten years, and in half the cases the results so far are satisfactory. In five cases a perceptible hypothyreoidism appeared fairly promptly after operation, but the author points out that these patients cannot be quite restored to normal even with the use of thyreoid extract. He remarks that pathologists are becoming more aware of the histological types of gland likely to be associated with a future thyreoid clinical deficiency. This would be a distinct benefit, for even with accurate follow-up, some degree of anticipation of possible complications would be helpful. Recurrences of toxic states are more embarrassing, but in the light of modern ideas surgeons now tend to leave less thyreoid tissue as a future target for a too fervid pituitary hormone. Fitz thinks that the thyreotoxic patient after operation should be most carefully followed for some considerable time, and should be under supervision as long as they live. No doubt in this way valuable and useful knowledge would be gained. Apparently there were none of the embarrassing ophthalmopathic cases in Fitz's series.

In conclusion, the author describes the ultimate result of thyreoidectomy as uncertain, even though the patient may be restored to useful life and work. His statement that operation does not reach the fundamental cause of the disorder will be accepted by all physicians and surgeons. In this condition a change occurs which in varying degree will affect the thyreoid gland, the heart, perhaps the ocular

[1] *The Journal of the American Medical Association*, August 5 and 12, 1944.

mechanism, and certainly in some way or other the general body cells. By saying that there is an important metabolic change in the body which may swing in activity one way or the other and which usually has ome abiding results, we do not explain the disease. The word "metabolism" can be a blessed Mesopotamia of a word; so, too, can "personality". Perhaps by lifetime studies on these patients the students of internal medicine, both clinical and chemical, may add to our understanding.

THE EFFECT OF ALCOHOL ON THE CENTRAL NERVOUS SYSTEM.

THE diagnosis of even gross clinical intoxication by alcohol presents difficulties, but these are perhaps few, certainly fewer than those involved in assessing the lesser grades of affection by alcohol. It has been stated that a concentration of 0·15% of alcohol in the blood is associated with a state of intoxication in most subjects. Alcohol is known to be a depressant of the functions of the central nervous system, following the familiar process of cerebral dissociation. It certainly would be an advantage if significant though small degrees of affection by alcohol could be measured. This measurement can be attempted in two ways, by estimating the percentage of alcohol in the body fluids and by estimating the response of the nervous system to relevant stimuli by some reliable test. Investigators have arrived at widely different results in chemical estimations. It is stated that levels of blood alcohol from 0·05% to 0·1% interfere with reflex actions and cerebral efficiency. Analyses of the amount of alcohol in the blood, saliva, urine and expired air have all been used, and in some parts of the United States of America these figures may be used as *prima facie* evidence in court. A. O. Gettler, W. Freireich and H. Schwartz have carried out some useful analytical investigations aimed at establishing the relationship between the concentration of alcohol in the blood and in the brain.[1] Their work was done on dogs and they found a wide range of values. They conclude that the alcohol content of the blood differs appreciably from that of the brain; in fact the blood-brain ratio in their experiments varied from 0·77 to 2·09. This agrees with previously published work by Gettler and Freireich in which observations of blood and cerebro-spinal fluid levels of alcohol were found to show great disparity. These authors agree that the blood alcohol content is a good index of intoxication, but only when the individual is indubitably drunk, with a blood alcohol content of the order of 0·3%. The interesting point about these researches is that if a court accepts 0·15% of alcohol as *prima facie* evidence of intoxication, such figures would be compatible with a brain alcohol level of 0·13% to 0·19%. Thus a chemical diagnosis of intoxication depending on these figures is not reliable.

Nor is the alcohol content of urine, saliva or expired air reliable in these border-line cases, for it depends in each case in part on the alcohol content of the blood, and will not necessarily run parallel at any given moment. N. Enzer, E. Simonson and G. Baliard have approached the problem from the standpoint of function.[2] They point out that there is a simple laboratory method which tests sensory and motor functions accurately, and does not depend upon volition or training. This is the measurement of the fusion frequency of flicker, in which a disk with four openings rotating in from an electric bulb is used. It indicates the excitability of the visual system, and therefore would appear to be a good method of measuring the degree of depression of the central nervous system produced by alcohol. Three normal subjects were investigated after the administration of diluted alcohol in doses of one to four ounces. Blood concentrations of from ten to fifty milligrammes *per centum* were shown to bear some significant relationship to impairment of nervous functions. These experiments are, of course, only on a small scale, and there is nothing in them to indicate how other factors such as shock, mental perturbation, fatigue and the like might imitate the effect of alcohol. It would appear that history repeats itself. It is possible for chemical or sensorimotor tests to be carried out with remarkable accuracy, but their interpretation is often obscure. The solution of the serious problem of alcohol and its relationship to the frequency of road accidents is not yet clear. But even if the ultimate solution lies through sociological and not physiological or biochemical studies, it is proper that all the light possible be turned on this question. In the paradoxical struggle between the life-preserving and life-destroying activities of human society we must throw what weight we have on to the side of preservation.

[1] *American Journal of Clinical Pathology*, July, 1944.
[2] *American Journal of Clinical Pathology*, June, 1944.

THE PREVENTION OF ACUTE GASTRIC ULCER.

PEPTIC ULCER has been very prominently brought before the notice of the medical profession during this war, and one of its most interesting and significant features has been the notable incidence of acute perforations in association with air raids. Cushing's classic communications on ulceration of the upper alimentary tract following operations on the central nervous system some years ago called attention to the parallel association of such ulcers with psychic stress and trauma. With knowledge of this sort in mind, we should have anticipated an increase in these peptic alarm reactions, but at least all further work on the subject is welcome. Hans Selye and Alan Maclean have published a paper on the experimental aspect of the problem.[1] It has been found that acute gastric ulcers can be produced in animals by exposure to various noxious agents, such as toxic drugs, cold, muscular fatigue, or more vaguely, surgical shock, and that this curious reaction is but part of the alarm reaction. Selye and Maclean have followed up the previous observations that damaged tissues have an increased glucose consumption, and that fasting enhances the formation of peptic ulcers. By a violent surgical procedure it was found possible to produce acute bleeding ulcers in the stomach of rats, this sequel being part of a general reaction including enlargement of the adrenal cortex, atrophy of the thymus and hæmoconcentration. The procedure adopted was the transection of the spinal cord at the level of the seventh cervical vertebra. Two groups of animals were tested, one after fasting for six hours, the other without any deprivation of food. Ulcers were found when the animals were killed after sixteen hours, but only in the case of those who had been subjected to fasting. The effect of feeding the fasted animals was tried, and also that of the administration of alkalis. Both these manœuvres acted as protectives against ulcer formation, though in varying degree. It is interesting that buffer solutions such as "Amphojel" were very effective, but sodium bicarbonate was ineffective. More interesting still was the effect of dextrose, which in concentration of 33% was successful in preventing ulcer formation whether given by mouth or intravenously. Other forms of noxious stimulation were tried as the excitant cause of ulcer, such as rapid lowering of the body temperature and the administration of formaldehyde, and in these experiments the result was the same. Thus food *per se* acted as a protective, but glucose was more effective than the food usually given to such laboratory animals. In view of this the authors decided to investigate the possible role of hypoglycæmia, but experiments did not indicate that the level of the blood sugar showed any causal association with the formation of ulcers. The dose of dextrose found to be effective in preventing ulcers was small and did not appreciably raise the blood sugar level during the course of the experiment. It would seem that clinical observations along these lines could be made with advantage.

[1] *The American Journal of Digestive Diseases*, October, 1944.

Abstracts from Medical Literature.

RADIOLOGY.

Ornithotic Pneumonia.

A. MELAMED AND JACOB M. FINE (*American Journal of Roentgenology*, May, 1944) present three cases of ornithosis with demonstrable pulmonary changes. The fact is emphasized that many cases of so-called atypical pneumonia of unknown ætiology are actually due to a psittacine or psittacine-like virus; the frequency of such an infection is undoubtedly underestimated. Complement fixation tests for ornithosis should be performed in all cases of atypical pneumonia, even in the absence of known contact with infected or sick birds.

Aseptic Necrosis in Adult Caisson Workers and Others.

HENRY K. TAYLOR (*Radiology*, June, 1944) discusses bone and joint lesions in workers in compressed air and notes the occurrence of similar lesions in persons with no such occupational history. The author's own observations include 54 patients with aseptic necrosis and bone infarcts, of whom 13 were females. Of the 41 males, 12 gave a history of continued occupational exposure to compressed air, and one gave a history of a single exposure. The others gave no occupational history. Of the 13 patients who had worked under compressed air for varying periods of time, some were subjected to sudden changes of atmospheric pressure and had experienced symptoms of aeroembolism, decompression illness or "bends". Others were not subjected to sudden changes in atmospheric pressure. Of this last group, some had mild or subacute symptoms of decompression illness and others did not. Shaft and joint lesions do not develop immediately after decompression illness; considerable time must elapse. The shaft lesions are usually asymptomatic and are discovered accidentally. In the joints, secondary arthritic changes occur, resembling chronic hypertrophic osteoarthritis. The lesions observed in the 41 patients who had never worked under compressed air and had never been subjected to sudden or violent changes in atmospheric pressure were similar to those in the occupational group. Some of the lesions presented identical Röntgen appearances and could not be differentiated from the lesions in the occupational cases. Aseptic necrosis was found in one case of sickle-cell anæmia, in which there was a history of rheumatic fever and polyarthritis was present. In the caisson worker the ætiological factor is the presence of an inert gas, nitrogen, in bubble formation, either forming an embolus or producing pressure, or both, thus interfering with the circulation to the part. In the non-caisson worker there is no apparent ætiological factor. The explanation of the circulatory obstruction remains unknown. Bone infarcts are usually limited to either one or both ends of a long bone, but more than one bone may be involved. The lower extremities are the more usual site. In caisson workers, the lesions as a rule are extensive, multiple, and often bilateral. In some cases they are limited to either the proximal or the distal end of the medullary cavity, or both, or to one or both diaphyseal ends. In other cases, they are limited to the spongy bone in the epiphyseal end, or again they may involve both the medullary cavity and the contiguous spongy bone of the diaphyseal and epiphyseal ends. When the epiphyseal end of the bone is involved, the articular cartilage may participate in the lesion. Involvement of the central portion of the shaft is infrequent. In the shaft, the lesion appears as an irregular area of altered or decreased density, sometimes, but not always, surrounded by a thin linear area of increased density, representing a partial reossification. Linear strands of ossification may project from the periphery for variable distances into the area of decreased density in one or more places. Also, there may be an increase in density depending upon the extent of the reparative changes. The lesion is limited to the medullary portion of the bone, and does not encroach upon the cortex. The area of altered density in the medullary cavity may extend into the spongy diaphysis. When the epiphyseal end of the bone and articular cartilage are involved, the articulating surface may or may not present an irregularity in contour; often it appears altered in shape. Infarctions or sequestrations or areas of aseptic necrosis may be present. The end of the bone may be of uneven density; it may show fibrocystic changes, with intervening areas of increased bone density or sclerosis. The joint space may be narrowed and partially destroyed.

Right Aortic Arch with Report of Eight Cases.

DAVID EISEN (*Radiology*, June, 1944) states that there are two varieties of right aortic arch. In the simple or anterior type, the aortic arch loops over the right main bronchus and then passes straight downward, the transverse arch being anterior to the trachea and œsophagus as in the normal subject. This type is uncommon. In the posterior or retro-œsophageal type a more complicated course is followed. After passing over the right main bronchus, the transverse arch takes a turn to the left behind the œsophagus. It then swings to the right and descends as a rule slightly to the right of the mid-line. From the ascending portion of the arch, before it passes over the right bronchus, the left subclavian artery branches off from a common trunk with the left common carotid artery and passes to the left, in front of the trachea. From the anterior surface of the descending arch, after it has emerged to the left from behind the œsophagus, there arises a diverticulum which is joined to the left subclavian artery by a short obliterated vessel. In this arrangement the trachea and œsophagus are surrounded by a complete vascular ring, the tightness of which presumably determines whether or not compressive symptoms will arise. The Röntgen appearance is pathognomonic, more so than in any other congenital abnormality of the heart or great vessels. The findings may be divided into two groups—those due to the abnormal position of the aortic arch and those due to its absence from the normal position. In the former group is included the characteristic right-sided shadow of the ascending arch of the aorta. Pulsation, especially in its upper portion, may be difficult to detect. The dextrally placed ascending aorta rises about one or two centimetres higher than normally, to about the level of the sterno-clavicular articulation, before merging with the transverse arch. This increased height of the transverse arch is due to the fact that it crosses over the right main bronchus, which is on a higher level than the left, and it forms an important diagnostic feature. In the right anterior oblique position the transverse arch of the aorta may be seen tangentially or in contour as a rounded or slightly oblong shadow. Within this shadow there has been described a smaller, darker, rounded shadow supposedly due to the superimposed shadow of the diverticulum. Such a shadow would presumably occur only if the angle of obliquity was such that these structures were exactly superimposed. The aortic shadow is situated immediately anterior to the spine instead of in the normal position, where it is separated from the spine by the radiolucent trachea. In the part of the trachea which is immediately in front of the transverse arch, forward bowing and occasionally slight stenosis are present. More obvious, and hence more diagnostic, is the displacement of the œsophagus seen when barium is administered. This structure is displaced to the left by the ascending arch and forward by the transverse arch, and its right and posterior surfaces are indented by these respective portions of the arch. The indentations are proportional to the size and shape of the portions of the aorta involved. The width between the œsophagus and the right border of the vascular shadow in the anterior view represents the width of the ascending aorta. A small indentation is sometimes seen on the left and anterior walls of the œsophagus at the same level as the larger one on the right and posterior walls. This is due to pressure from the left aortic arch remnant, either the subclavian artery as it passes in front of the œsophagus or the diverticulum on its left side. The presence of this indentation implies a tightness of the vascular ring around the œsophagus and trachea, and one would expect to find objective evidences of obstruction in these cases.

Venography.

E. C. BAKER AND F. A. MILLER (*Radiology*, August, 1944), discussing venography, state that twenty cubic centimetres of contrast medium (diodrast) are injected into any accessible vein below the ankle through a twenty-five or twenty-six gauge needle. A venipuncture is made through the skin without incision. The dye is injected over a period of two minutes. Three fourteen by seventeen inch films are used, with two exposures to a film, one-half of the film being used for each. The paired exposures are made from stereo positions. Two exposures cover the area from the ankle to the knee; two the area of the upper part of the leg, knee and lower part of the thigh; and two the remainder of the thigh and the lower part of the pelvis. The first exposure is made just after the injection of approximately seven cubic centimetres or after forty seconds have elapsed from the beginning of the injection. The other five exposures fol-

low in rapid succession, the last being completed at approximately the time of completion of the injection, or two minutes after the beginning of the procedure. These exposures give three overlapping pairs of films including the area from the ankle to the lower part of the pelvis. On the basis of a large number of cases, in which a block of the venous stream was demonstrable at some point, it appears that for purposes of interpretation, the venous structures of the leg and thigh can be divided very simply into a superficial plexus and the deep veins. These two systems of venous return have many communications both in the leg and in the thigh. From the standpoint of the radiologist the dye pattern in most cases actually demonstrates a block. The skiagram reveals no evidence of the ætiology, but indicates definitely the site and frequently the extent of the block. These patterns are divided into superficial and deep block, with subdivisions into acute or chronic. The first and most easily demonstrated pattern shows the dye stopping abruptly at the site of a connecting vessel and turning directly inward or somewhat backward toward the deep circulation or another area of the superficial plexus. From the point of block upward, no superficial plexus is demonstrated in the area of the block. The second pattern—slightly more difficult to recognize—in acute superficial block shows short lengths of straight, non-tortuous, and non-dilated veins extending upward and apparently fading out in the tissues. In the chronic superficial block, the veins visualized are dilated and tortuous and the passage of the dye upward is usually slow. In films showing proper soft tissue detail, numerous dilated varicose veins in the superficial tissues, which do not fill with the dye, are frequently seen. The distinguishing characteristics of chronic as opposed to acute disease, whether in the superficial or the deep circulation, are the tortuosity of the veins and the considerable increase in their lumen. The pattern of the chronic deep block is the easiest to recognize of any venographic patterns. The deep circulation is absent in whole or in part. The dye usually enters branches of the internal saphenous vein rather promptly, and by the time the knee is reached, all of the dye is returning upward through that vein. The entire internal saphenous vein from the femoral fossa downward well into the leg is dilated and usually quite tortuous, and from the physiological standpoint the upward passage of the dye is considerably slowed. Coming off from the internal saphenous vein can be seen short lengths of communicating veins which fade out into the tissues. These veins are considerably larger than the usual normal communicating veins and are frequently very tortuous. In cases in which this chronic deep block involves the leg alone, most of the dye returns by means of communicating veins above the knee to the femoral vein. It is perhaps fortunate that this pattern of chronic deep block is easily recognizable. Patients with a complete block of the entire deep circulation of the leg and thigh are frequently those showing very large, dilated, superficial varicosities extending from the mid-leg upward along the inner portion of the leg, knee and thigh. These veins are a temptation to any surgeon. The venogram shows that the tortuous dilated vein is a main channel for carrying the blood flow upward to the femoral fossa.

PHYSICAL THERAPY.

A Rehabilitation Centre for the Injured Worker.

J. S. COULTER (*Archives of Physical Therapy*, September, 1944) describes the work of a rehabilitation centre for the injured worker. He states that rehabilitation is the planned attempt through the use of all recognized measures under skilled direction to restore those persons who, because of disabilities, do not assume as quickly as possible that place in the productive stream of society which they are potentially capable of assuming. Rehabilitation of injured persons requires prompt use of coordinated physical, occupational and recreational therapy. Physical therapy—the use of heat, massage and exercise—should begin while the patient is still in bed. Occupational therapy should be prescribed to suit each patient's needs by a physician who has a thorough knowledge of physiology, pathology and bodily mechanics. It should aim, not merely at improving the mental condition, but also at restoring the muscles which the patient uses in his regular occupation. The chief object of recreational therapy is the social adjustment of the patient. This can often be accomplished by helping him to excel at a given form of recreation. When convalescence is psychologically protracted, Solomon's method of psychiatric guidance in combination with physical and occupational therapy is advisable. In planning the treatment of an injured worker in the curative workshop, the physician should remember Griffiths's theory of the conditioned reflexes of industry, and should direct the occupational therapy towards the restoration of the patient's particular work-conditioned reflex. In the restoration of limb function after injury, active resistive exercises are of more value than generalized, free-swinging exercises, because they are localized and controlled.

Carcinoma of the Naso-pharynx.

C. M. THOMPSON AND E. L. GRIMES (*The American Journal of the Medical Sciences*, March, 1944) discuss carcinoma of the naso-pharynx; they base their findings on a series of seventeen patients. They state that there is a general unawareness of carcinoma of the naso-pharynx and its clinical syndrome; consequently the lesion is poorly controlled. The average age of their patients (38·5 years) is lower than that associated with tumours of the mouth (fifty-six to fifty-eight years). Fifteen of the patients were male, two were female; two patients were Chinese and four were Negroes. On admission to hospital, every patient had cervical lymph node metastases; eleven patients had noticed this enlargement as the first symptom. Three patients complained first of epistaxis; ten others later suffered from it. One patient first complained of ear symptoms; thirteen suffered from tinnitus or deafness during their illness. Nine patients showed signs of cranial nerve involvement. In five cases X-ray films of the base of the skull revealed a melted-out defect of the middle fossa. In two cases there was clinical evidence of involvement of the cranial nerves without radiological evidence of damage to the base of the skull; the reverse was true in one case. The average duration of symptoms to the time when the diagnosis was established was 8·1 months. The authors deplore the loss of precious time that is brought about in this disease by the performance of operations due to a mistaken diagnosis. They state that all their patients were suffering from late carcinoma of the naso-pharynx. Once the diagnosis is certain, irradiation to the limit of the skin and physical tolerance is the only form of treatment. Of the authors' seventeen patients, two only were alive at the time when the report was written; the others had had an average duration of life of 23·4 months from the time of the first symptom. Profoundly ill patients can be given dramatic temporary relief by irradiation. Several of the authors' recent patients were rendered symptom-free for weeks or months, with complete clinical regression of the primary tumour and also of the enlarged cervical lymph nodes. Subsequent recurrence of the tumour or metastases is radio-resistant; therefore, once the diagnosis is established, all patients should be treated to the limit of tolerance, even though clinical signs of disease are no longer present. The practice of irradiating cervical lymph node enlargement without adequate examination of the naso-pharynx is to be condemned.

Exercise after Myocardial Injury.

WILBUR C. THOMAS AND TINSLEY R. HARRISON (*The American Journal of the Medical Sciences*, October, 1944) report a series of experiments performed with a view to showing the advantage or disadvantage of prolonged bed rest and restriction of movement in the treatment of acute myocardial disorders. They state that opinions on the matter differ widely and are not based on scientific data. The authors used rats for the experiments, which are described in detail. They found that after experimental injury to the hearts of rats, the mortality rate was much greater when the animals were kept closely confined in small cages which restricted muscular activity than when they were not so confined. Confined animals displayed considerably less activity, as measured by the work adder method, than control animals allowed to wander freely about in larger cages. Observations with the optional treadmill showed that after heart injury the rats tended to return to the pre-operative level of exercise within a period of three to seven days. Enforced strenuous muscular effort, even when carried out within twenty-four hours after cardiac injury, did not materially increase the mortality rate; the same observation applied to such exercise carried out three or more days after heart injury. The authors point out that conclusions regarding human patients cannot be drawn from this series of experiments for many reasons, including species difference. However, on the basis of available evidence it appears that during the first two weeks the advantages of strict bed rest probably outweigh the disadvantages, but that after this time the reverse is probably true.

Public Health.

AN INVESTIGATION INTO MATERNAL MORTALITY.

THE following is a report of an investigation into maternal mortality in the metropolitan area of Sydney covering a five-year period and carried out by the Special Medical Committee appointed by the Department of Public Health, New South Wales.[1]

In 1939 a scheme was inaugurated for the reduction of maternal mortality and a confidential brochure was circulated to all registered medical practitioners in Sydney giving full information concerning its practical working. The provisions of the scheme include a free consultant service for all mothers unable to afford to pay the usual fees; in the brochure the names and addresses of consultants, who were willing to give this service and be paid a reduced fee by the Department of Public Health, were listed. The medical practitioner selects and calls the consultant by telephone direct. Information in the brochure concerning the Mobile Blood Transfusion Unit indicates that the Women's Hospital, Crown Street, which has cooperated with the Department of Public Health and maintained the medical and nursing service for this unit for five years, will send out the unit at any time of the day or night. In addition, detailed instructions concerning bacteriological control of puerperal infection were set out.

As part of this scheme a committee known as the Special Medical Committee was appointed by the Department of Public Health to investigate all maternal deaths in the metropolitan area of Sydney. The committee was to decide whether these deaths were preventible, whether any extension of the scheme as instituted would be necessary, and whether any additional facilities would be required to reduce the maternal death rate.

When the scheme was inaugurated for the metropolitan area of Sydney it was anticipated that a similar scheme would be planned for rural areas, but the outbreak of war in September of that year prevented any such extension.

The Special Medical Committee appointed to investigate maternal deaths is as follows: Dr. E. S. Morris, Director-General of Public Health; Professor J. C. Windeyer, Emeritus Professor of Obstetrics, University of Sydney; Professor B. T. Mayes, Professor of Obstetrics, University of Sydney (appointed in March, 1941); Dr. A. J. Gibson, Senior Honorary Medical Officer, Women's Hospital, Crown Street; Dr. H. A. Ridler, Senior Honorary Medical Officer, Royal Hospital for Women; Dr. Lindsay Dey, appointed by the British Medical Association to represent general practitioners; Dr. Grace J. Cuthbert, Director of Maternal and Baby Welfare; Dr. P. L. Hipsley resigned in March, 1941, and Dr. A. M. Davidson was appointed in the place of Dr. Lindsay Dey in March, 1944.

This report is based on the committee's investigations of each maternal death which occurred in the metropolitan area of Sydney in the five years 1939-1943. There were 632 deaths examined to determine whether or not they should be classed as maternal. Of these, 511 were finally classified as such. The report refers to the deaths thus classified. "Metropolitan Area" indicates the Metropolitan Combined Sanitary District as determined by the regulations under the *Public Health Act*.

In 1934 a report of an investigation carried out by Dr. E. S. Morris and Dr. E. S. Morgan was published in the "Annual Report of the Director-General of Public Health". This represented investigation into 1,073 puerperal deaths occurring in the State of New South Wales from 1929 to 1933. Numerous case histories were quoted, arranged in groups under clinical headings, and conclusions concerning the percentage of deaths which were capable of control were presented.

METHODS, PURPOSE AND SCOPE OF THE PRESENT INVESTIGATION.

The object of the investigation is to discover any means whereby the maternal death rate can be reduced, and to recommend any measures other than those implemented in 1939 which could assist doctors, midwives or hospitals in this objective, or to recommend any further health education programme.

The essential feature of this report is the study of individual maternal deaths. Information concerning each death is obtained from the doctors, nurses or hospitals concerned. For this purpose a *questionnaire* marked confidential has been devised to obtain precise and brief information, with the least possible effort to the attendants, concerning the personal social history of the mother, supervision of pregnancy, conduct of labour and care during the puerperium. The data thus obtained allow for a proper consideration of each case. (The *questionnaires* are set out in Appendices I and II, which have not been included owing to lack of space.)

A specially qualified nurse visits the private hospital or home of the mother to ascertain, when necessary, facts concerning the personal history and home conditions of the

[1] This report will appear later in the annual report of the Director-General of Public Health of New South Wales. It was presented at a meeting of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association by Dr. Grace Cuthbert, Director of Maternal and Baby Welfare, Department of Public Health, New South Wales.

TABLE I.

Showing Classification of Maternal Deaths for the Years 1940-1943.

Cause.[1]	1940.			1941.			1942.			1943.		
	Preventible.	Non-Preventible.	Total.	Preventible.	Non-Preventible.	Total.	Preventible.	Non-Preventible.	Total.	Preventible.	Non-Preventible.	Total.
140A ..	—	—	12	—	—	2	—	—	8	—	—	11
140B ..	—	—	26	—	—	20	—	—	25	—	—	21
141A ..	—	—	0	—	—	4	—	—	2	—	—	1
141B ..	—	—	1	—	—	4	—	—	2	—	—	2
142	2	5	7	2	2	4	5	3	8	4	2	6
143	1	0	1	0	1	1	0	0	0	0	0	0
144A ..	2	0	2	0	3	3	1	1	2	3	0	3
144B ..	0	0	0	0	1	1	1	0	1	0	0	0
144C	0	0	0	0	0	0	0	0	0	0	0	0
144D ..	1	1	2	0	2	2	0	1	1	1	0	1
145	0	0	0	0	1	1	2	1	3	0	1	1
146	2	6	8	6	5	11	1	7	8	3	6	9
147A ..	11	2	13	4	5	9	10	6	16	11	6	17
147B ..	0	0	0	0	2	2	1	1	2	1	1	2
147C	1	4	5	0	10	10	1	1	2	2	2	4
148A ..	6	1	7	2	5	7	2	2	4	3	7	10
148B ..	2	2	4	1	3	4	1	1	2	1	1	2
148C	0	0	0	0	0	0	0	0	0	0	1	1
148D	2	1	3	0	4	4	1	0	1	1	0	1
149A ..	0	3	3	2	2	4	4	2	6	1	5	6
149B ..	3	0	3	1	2	3	1	2	3	0	0	0
149C	1	2	3	2	7	9	1	1	2	1	5	6
150A ..	0	0	0	0	0	0	0	0	0	0	0	0
150B ..	0	0	0	0	0	0	0	1	1	0	1	1
Totals ..	34[2]	27[2]	100	20[2]	55[2]	105	32[2]	30[2]	99	32[2]	38[2]	105

[1] The numbers are taken from the International List of Causes of Death (see Appendix IV).
[2] Note absence of 2 relative in abortion and total.

mother, with a view to discovering any social or economic factors in the events leading to the death.

Replies from these various sources concerning each case are correlated, and copies, marked confidential, are circulated to each member of the committee for scrutiny and criticism before discussions take place at each meeting.

Opinions may legitimately differ as to the relative importance of several factors giving rise to the fatal issue or as to whether morbid conditions not connected with the pregnant state may have been contributory factors. Careful detailed examination of all the facts in each individual case enabled conclusions to be made concerning classification and primary avoidable factors. (See section dealing with preventible deaths.)

Particulars of all maternal deaths in the metropolitan area have been examined by the committee since 1939. The present review, however, is based on an analysis of the deaths in 1940, 1941, 1942 and 1943 (see Table I). Those for 1939 have been excluded from this comparison because the International List of Causes of Deaths adapted for use from 1940 embodied a change of principle in classification which prevents a true comparison being made. A synopsis of deaths in 1939 is attached. (See Appendix III.)

The deaths assigned to the preventible and non-preventible categories are determined by assessing what the committee considers to be any deviation from reasonable standards of obstetric practice and the expected cooperation of the mother with due regard to available facilities, for example, the free consultant service, the mobile blood transfusion unit, a free bacteriological service and eight pre-natal clinics. The pre-natal clinics at selected areas distant from the metropolitan obstetric hospitals are supervised by a medical officer with special qualifications; they are intended for those mothers who are unable to afford private fees or for patients of those medical practitioners who are too overloaded with work to give proper and continuous pre-natal supervision.

For the health education programme which is fundamental to the reasonable cooperation of the mothers, the Department of Public Health provides an up-to-date booklet on pre-natal care. This is obtainable free of cost by all mothers in the State. The department, in collaboration with Professor Windeyer and the late Miss Barbara Mortimer Thomas and Miss Mollie Moseley, produced in 1938 a sound film for training purposes on the methods of physiotherapy in pregnancy and the puerperium; as a result of this film a high standard of training of students has been established in collaboration with the New South Wales Branch of the Australian Physiotherapy Association. This high standard has also been responsible for the inauguration of post-natal physiotherapy in the chief metropolitan obstetric hospitals and a pre-natal physiotherapy clinic at the Royal Hospital for Women. A sound film, "Modern Motherhood", also produced by this department, is available for circulation to all cinema theatres in New South Wales. These educational films indirectly will assist in bringing about a reduction in the number of maternal deaths in connexion with childbirth as well as in reducing ill health following childbirth.

A death was included in the preventible group when in the opinion of the committee the case history revealed deviations from a reasonable standard of obstetric practice, or want of cooperation by the mother in the pre-natal period. The first deviation is regarded as the primary avoidable factor. (*Vide* "primary avoidable factor" *infra*.) A death was included in the non-preventible group when the committee considered that reasonable skill and care had been given during pregnancy and in the conduct of labour, and that the mother had sought pre-natal care and obeyed instructions, and that her home surroundings, diet and general health had been satisfactory.

VITAL STATISTICS.

The composition of the total maternal mortality rate in New South Wales is shown in Table II.

In the official statistics of Australia the classification of causes of death is based on the information entered on the death certificate by the doctor in attendance, or on the finding recorded by the coroner if the case comes under his jurisdiction. Thus the value of the classified data depends upon the accuracy with which the cause of death is certified or recorded.

The causes are classified in accordance with the International List of Causes of Death adapted to the particular requirements of this country. Decennial revision by the International Commission ensures that current changes and developments in medical science, public health practices and statistical procedure are properly reflected in the list. The current edition is based on the fifth revision and has been in use in Australia since January 1, 1940.

The section of the list which is relevant to the work of the Special Medical Committee is "Group XI—Diseases of Pregnancy, Childbirth and the Puerperal State", which embraces eleven numbered titles with twenty lettered subtitles. (See Appendix IV.) In the current edition maternal deaths are distinguished on the basis of whether or not a delivery has occurred and the titles of the group conform to the following general order.

140, 141: Abortion (gestation less than 28 weeks).
142: Ectopic gestation.
143-145: Conditions of pregnancy (death before delivery).
146-150: Conditions of childbirth and the puerperium (death during or after delivery, gestation 28 weeks or more).

This arrangement serves to emphasize that deaths from abortion and ruptured ectopic gestation as well as deaths of women who die undelivered are included in the group upon which the maternal mortality rate is based. It is therefore competent to examine the "exposed to risk" factor used in the calculation of the rate to determine whether or not the maternal mortality rate in New South Wales adequately represents the true level of mortality among pregnant women.

The manner in which the deaths and the "exposed to risk" among whom the deaths occur are recorded is shown in Table III.

TABLE III.

Pregnancy Terminated by.	How Pregnancy Recorded.	
	Fatal Termination.	Non-Fatal Termination.
(1) Abortion—spontaneous or induced	Death registered.	No record.
(2) Ectopic gestation	Death registered.	No record.
(3) Death before viability of fœtus (n.e.i.)	Death registered.	Not applicable.
(4) Death before delivery (viable)	Death registered.	Not applicable.
(5) Delivery—live birth	Death registered. / Birth registered.	Birth registered.
(6) Delivery—stillbirth	Death registered. / Birth registered.	Birth registered.

In items 5 and 6 the number of pregnancies is definitely recorded through the birth statistics. In items 2, 3 and 4, although the number of pregnancies is not recorded through the birth statistics, the true number is inferred from the

TABLE II.

Year.	Number of Maternal Deaths.	Maternal Death Rate per Thousand Live Births.	Number of Live Births.	Live Birth Rate per Mean Population	Number of Stillbirths.[1]	Stillbirth Rate per Thousand Total (Live and Still) Births.	Total Number of Births.
1936	236	5·11	46,193	17·31	1,419	29·80	47,612
1937	198	4·17	47,497	17·63	1,452	29·66	48,949
1938	181	3·82	47,319	17·39	1,473	30·19	48,792
1939	162	3·38	48,003	17·46	1,360	27·55	49,363
1940[2]	172	3·48	49,382	17·79	1,342	26·46	50,724
1941[2]	176	3·40	51,729	18·48	1,464	27·52	53,193
1942[2]	170	3·23	52,647	18·60	1,411	26·10	54,058
1943[2]	167	2·92	57,265	20·03	1,465	24·94	58,730

[1] Table commences at 1936 as stillbirths were first registered in 1935.
[2] Acute yellow atrophy of the liver is excluded so as to preserve comparability.

number of deaths, which must represent all pregnancies thus terminated (item 2 non-fatal terminations are so rare as to be ignored for all practical purposes). In any case the total additional pregnancies from these items are relatively unimportant—only about 50 to be added to 105,000 pregnancies already recorded in categories 5 and 6 in the metropolitan area during the four years covered by this survey. Only in item 1 is there a significant number of pregnancies for which a record is unobtainable.

It is therefore seen that in New South Wales the maternal deaths may be related to the precise number of women exposed to risk of such death, except for those who have a non-fatal abortion. This shortcoming is not peculiar to New South Wales, but is general in all countries. It creates only a minor disability because a precise connexion between deaths and the "exposed to risk" still exists for all maternal deaths excluding abortion, which, after all, is perhaps a more significant figure than the combined total. Rates calculated on live births only, live births *plus* stillbirths, or on confinements of individual mothers, have been published in "the "Official Year Book of New South Wales". It is obvious that for any one period of time the actual level of the rate will vary slightly according to the basis of calculation adopted and care must be taken to use the base best suited to any particular purpose. For the purpose of determining the trend in maternal mortality it matters little for practical purposes which base is used, so long as the comparison is confined to the same base.

PREVENTIBLE DEATHS LISTED UNDER THE HEADING OF PRIMARY AVOIDABLE FACTORS.

The numbers of preventible deaths listed under the heading of primary avoidable factors, including abortions, Causes 140 and 141 (A and B), in the complete five-year period were as follows:

1939	75 (including 41 abortions)
1940	73 (including 39 abortions)
1941	50 (including 30 abortions)
1942	69 (including 37 abortions)
1943	67 (including 35 abortions)
Total	334 (including 182 abortions)

Of the 511 maternal deaths, 177 were classed as non-preventible. In 152 instances the committee considered that one or more avoidable factors had contributed to the fatal issue, and in addition 182 mothers died from abortion, 135 of the abortions following criminal interference.

The primary avoidable factors agreed upon by the committee are: (*a*) Error of judgement in management on the part of the doctor or hospital. (*b*) Omission or inadequacy of pre-natal care, the fault of the doctor. (*c*) Negligence on the part of the patient to attend for pre-natal care or to follow advice given or of her relatives to induce her to attend. (*d*) Lack of, or failure to use, reasonable facilities.

Error of Judgement in Management.

Error of judgement in management on the part of the doctor or hospital was responsible for 60 deaths as follows:

1940	13 cases (4 followed Cæsarean section)
1941	9 cases (4 followed Cæsarean section)
1942	20 cases (7 followed Cæsarean section)
1943	18 cases (6 followed Cæsarean section)

These errors were due: to lack of recognition by the doctors concerned of the degrees of disproportion in *primiparæ* or of the importance of previous histories; to failure to seek a consultant's opinion sufficiently early to be useful; to lack of judgement as shown by untimely or unskilled interference; to failure to assess the degree of toxæmia and so to institute proper treatment.

It was found frequently that in complicated and difficult cases, patients who had been transferred by an experienced general practitioner for treatment in surroundings where every obstetrical facility would be available, were not referred early enough to the responsible honorary medical officer or the honorary medical officers' opinions were not sought early enough; in this way further difficulties and complications arose in public maternity hospitals.

The committee requested the Director-General of Public Health to inquire from each public maternity hospital used as a training school for medical students or for obstetric nurses, whether sufficiently clear instructions were given to the resident medical officers to seek the opinion of the responsible honorary medical officer early in all complicated and difficult cases.

The Omission or Inadequacy of Pre-Natal Care.

Omission or inadequacy of pre-natal care on the part of the doctor resulted in 14 deaths as follows:

1940 .... 6 cases (5 of the patients were *primiparæ*)
1941 ..... 1 case (the patient was a *primipara*)
1942 ..... 1 case (the patient was a *multipara*)
1943 .... 6 cases (4 of the patients were *primiparæ*)

This group includes errors in diagnosis and treatment, because in many cases it was found that the doctor had not at any time recorded the blood pressure nor the weight, and in some cases had examined the urine only occasionally. In these circumstances the onset of the toxæmia was unsuspected and suitable treatment was not instituted.

The committee noted that rarely was there any indication that a careful family history had been taken in cases of toxæmia. It is considered that in all cases of toxæmia, in fact in all pre-natal care, the family history should be the subject of inquiry, particularly the history of cardio-renal disease, nephritic or cerebral catastrophes.

The failure to recognize the necessity for careful treatment of raised blood pressure, particularly if the family history was unsatisfactory, or if there was increase in weight, was regarded by the committee as contributory to the fatal issue in many of these cases.

Negligence on the Part of the Patient or Her Relatives.

Negligence on the part of the patient to attend for pre-natal care or to follow advice given or of her relatives to induce her to attend resulted in 27 deaths as follows:

1940 .. 10 cases (of the patients, 6 were *multiparæ*)
1941 .. 5 cases (of the patients, 4 were *multiparæ*)
1942 .. 5 cases (of the patients, 3 were *multiparæ*)
1943 .. 7 cases (of the patients, 5 were *multiparæ*)

In these cases the mother had failed to seek early pre-natal care, had not carried out the instructions given by the doctor, or had failed to report for further examinations.

Lack of, or Failure to Use, Reasonable Facilities.

Lack of, or failure to use, reasonable facilities was considered to be a primary avoidable factor in any case in which available facilities were not used. For instance, in a number of cases the mobile blood transfusion unit was not used when it was considered by the committee that a transfusion would have saved the patient's life. (See "Clinical Analysis".)

This was noted so frequently that the committee requested the Director-General of Public Health to send a memorandum to all medical practitioners on the treatment of puerperal hæmorrhage. (See Appendix V.)

CLINICAL ANALYSIS OF MATERNAL DEATHS.

The maternal deaths will be analysed under the following headings. In this classification the numbers given as causes are taken from the International List of Causes of Death.

1. Toxæmias of pregnancy and childbirth and the puerperium (Causes 144 and 148). (*a*) and (*b*) Eclampsia, albuminuria and nephritis. (*c*) and (*d*) Hyperemesis and acute yellow atrophy of the liver.
2. Hæmorrhage of childbirth (Cause 146). Hæmorrhage of pregnancy (Cause 143).
3. Infection during childbirth and the puerperium (Cause 147). (*a*) Puerperal infections. (*b*) Thrombophlebitis. (*c*) Embolism and sudden death.
4. Accidents of pregnancy and childbirth. (i) Accidents of pregnancy—ectopic gestation (Cause 142). (ii) Accidents of childbirth (Cause 149). (*a*) Cæsarean section. (*b*) Surgical operations and instrumental delivery. (*c*) Obstetric shock.
5. Other diseases and accidents of pregnancy (Causes 145 and 150) and childbirth.
6. (*a*) Criminal abortions. Septic (Cause 140B). Non-septic (Cause 141B). (*b*) Spontaneous abortions. Septic (Cause 140A). Non-septic (Cause 141B).

TOXÆMIAS OF PREGNANCY AND CHILDBIRTH AND THE PUERPERIUM.

The group of deaths included under the heading "Toxæmias of Pregnancy and Childbirth and the Puerperium" (Causes 144 and 148), (*a*) and (*b*), (*c*) and (*d*), comprise those from eclampsia (when fits have occurred), albuminuria and nephritis, acute yellow atrophy of the liver and other toxæmias including hyperemesis of pregnancy and of the puerperium up to three months after childbirth. The cases in this group number 68 (see Table IV).

TABLE IV.

Year.	Non-Preventible Deaths.	Preventible Deaths.	Total.
1940	5	13	18
1941	18	3	21
1942	5	6	11
1943	9	9	18
Total	37	31	68

Seasonal Incidence.

The seasonal incidence of these 68 cases is set out in Table V and the incidence is higher in the winter months.

TABLE V.

Month.	Number of Cases.	Quarterly Total.
January	3	
February	2	7
March	2	
April	9	
May	6	24
June	9	
July	10	
August	9	25
September	6	
October	4	
November	4	12
December	4	
Total	.. .. ..	68

Eclampsia; Albuminuria and Nephritis of Pregnancy and the Puerperium.

Parity.

The toxæmias remain one of the major causes of maternal deaths, approximately 50% of which occurred among *primiparæ*. The parity in 50 cases is shown in Table VI.

TABLE VI.

Parity of Patient.	Number of Deaths.
0	21
1	8
2	6
3	5
4	2
5	2
6	1
7	1
8	2
Not stated	2
Total ..	50

Pre-Natal Care.

In the cases of eclampsia and albuminuria and nephritis of pregnancy and the puerperium, the primary avoidable factors were mainly the lack of or inadequate pre-natal care. Of the 50 cases, 24 were regarded as preventible. The type of ante-natal care given is shown in Table VII.

The main factors in defective pre-natal care by the attendant were: (i) The repeated omission of the weight record which in many cases may have been the only indication of an impending toxæmic state. (ii) The omission in some cases of the blood pressure recording. (iii) Failure to regard with suspicion a systolic pressure of 130 millimetres of mercury and over and diastolic pressure of 80 millimetres or over. (iv) Lack of suitable measures to treat the rising pressure. (v) Failure to recommend admission to hospital when blood pressure is 140 millimetres of mercury or over and particularly if there is a trace of albumin. (vi) Failure to insist on a resting and careful observation period of forty-eight hours in hospital with appropriate treatment, before proceeding with an induction of labour.

TABLE VII.

Type of Care.	Number of Cases.
Defective because of patient's lack of care	11
Defective because of medical attendant's lack of care	8
Defective because of patient's and attendant's lack of care	5
Reasonably good	7
Good	18
Insufficient information	1
Total	50

In the committee's opinion the appearance of albumin in the urine should be regarded as a late symptom of toxæmia.

Frequently no treatment and no special supervision were instituted when a marked rise in blood pressure had occurred. This occurred so often that the committee requested the Director-General of Public Health to write to all metropolitan obstetric training schools requesting that in such cases patients should receive special attention. The replies indicated that in some hospitals the proper routine was already in practice.

Anæsthesia.

In the opinion of the committee, the choice and method of administration of anæsthesia in toxæmias are important. When a light, short anæsthesia is required nitrous oxide gas and oxygen are to be preferred; when a deeper anæsthesia is desirable a more potent drug must, of course, be chosen, but there appears to be little doubt that it is advanageous to use ether with oxygen by machine rather than alone. Of the patients who died from toxæmia, seventeen were given ether, ten chloroform, one ether and gas and oxygen, two chloroform and gas and oxygen, two ether and chloroform, two ethyl chloride and ether, one gas and oxygen and ethyl chloride, and only one had gas and oxygen alone. In the other cases the type of anæsthetic used was not stated; most of these patients died in hospitals where a machine for a mixture of oxygen and anæsthetic agent is available.

Error of Judgement in Management on the Part of Doctor or Hospital.

The following two case histories show error of judgement on the part of doctor or hospital.

CASE 93, CAUSE 148A.—The patient was twenty-six years of age. The pregnancy was her third. There was a history of albuminuria with both previous pregnancies. The patient was under regular private medical supervision during this pregnancy from the early months. At six months the systolic blood pressure was recorded as 140 millimetres of mercury and the diastolic as 90 millimetres with some albumin in the urine. At eight months the systolic blood pressure was recorded as 160 millimetres of mercury and the diastolic as 90, still with albumin in the urine. The patient was allowed to come into labour when she had her first fit. She was transferred to a public maternity hospital where she was admitted in an unconscious condition. There, further fits occurred during labour and a stillborn infant was delivered. In spite of treatment the patient died some days later.

CASE 111, CAUSE 148A.—The patient was thirty-two years of age. She was a *multipara*. She was under regular private medical supervision during pregnancy. Two weeks before term a heavy cloud of albumin was found in the urine; the doctor instructed the mother to "diet". Two weeks later the patient's husband awoke during the night and found her unconscious. She was admitted to a public maternity hospital in this unconscious state; she had two fits in hospital. Her systolic blood pressure on admission was 230 millimetres of mercury and the diastolic 150 millimetres; the blood pressure had never been taken at any time during the private supervision of pregnancy. Her husband stated that she had been very "swollen up" for three months. A live infant was delivered, but in spite of treatment the patient died five days later.

Omission or Inadequacy of Pre-Natal Care, the Fault of the Doctor.

The following history shows omission or inadequacy of pre-natal care, the fault of the doctor.

CASE 26, CAUSE 144A.—The patient was a *primipara*, aged twenty-two years. She visited her medical attendant every month, when the urine was tested. Her hands and feet were very swollen for one month prior to her admission to hospital, and no treatment or advice was given. On the day of her admission, the patient had an eclamptic fit, and on being summoned the doctor admitted her to a private hospital where equipment was inadequate to deal with her treatment; whereupon the patient was transferred to a public maternity hospital. On admission there, urine showed solid albumin, the systolic blood pressure was 188 and the diastolic pressure 90 millimetres of mercury, and marked œdema of face, hands and legs was present. Cyanosis and signs of pulmonary œdema were present. Treatment by sedation with morphine and chloral hydrate, venesection and the removal of fifteen ounces of blood and eliminative treatment failed to avert a fatal issue. The patient died unconfined the following day. There was no record of her weight, blood pressure or urine tests prior to her admission to hospital.

Negligence on the Part of the Patient or Her Relatives.

The following are histories of negligence on the part of the patient to attend or of her relatives to persuade her to attend for pre-natal care, or to follow advice.

CASE 37, CAUSE 148A.—The patient was a *primipara*, an unmarried aboriginal girl, aged seventeen years. She attended the out-patient department of a hospital during the last three months of her pregnancy. On her last visit she was found to have œdema of the feet and a heavy albumin deposit in the urine. She was told that she would be admitted to hospital immediately, but she disappeared and went home. A week later she reappeared in early labour, with marked albuminuria. She had a fit just after admission, and a further eleven fits before delivery by high forceps of a living seven pounds infant. One fit occurred *post partum*. Albuminuria continued and her condition became restless and noisy and passed into coma. She died six days after delivery.

CASE 53, CAUSE 148A.—The patient, aged forty-two years, had a history of one normal pregnancy, followed by two others, during which severe toxæmia developed and resulted in the premature birth of a stillborn fœtus on each occasion. Her medical attendant advised termination of this last pregnancy, but the patient refused to consider this. Her condition was satisfactory until three weeks before death, when her blood pressure was grossly raised and albuminuria was present; on the day of her death she had several fits and complained of intense headache. Her systolic blood pressure was 230 and her diastolic pressure 140 millimetres of mercury. Further signs of extensive cerebral hæmorrhage were noted soon afterwards and she died shortly after being delivered by forceps, the cervix having been dilated and the membranes ruptured artificially.

CASE 58, CAUSE 148B.—The patient was a *multipara*, aged thirty years, in her eighth pregnancy. In spite of "kidney trouble" with previous pregnancies, she did not attend for ante-natal care until twenty-eight weeks pregnant. No abnormality was found then, and the patient did not attend again for a month, when she was admitted with four-fifths albumin in her urine and a systolic blood pressure of 170 and a diastolic pressure of 120 millimetres of mercury and œdema. Labour was induced by artificial rupture of the membranes and a macerated fœtus was delivered. Oliguria developed, progressing to complete anuria. There was no response to treatment and the patient died of uræmia.

CASE 117, CAUSE 148B.—The patient was aged twenty-six years and had had four previous normal pregnancies and labours. She did not seek medical attention until eight months pregnant with this pregnancy, when œdema was present, and the urine contained solid albumin. Retinitis was also present. The patient refused to be admitted to a public hospital as advised, but consented to enter a private hospital. Labour was medically induced, then the membranes were artificially ruptured. Labour progressed slowly, and shortly after a five pound macerated fœtus was born the patient collapsed suddenly and died.

Other Toxæmias: Acute Yellow Atrophy of the Liver and other Toxæmias of Pregnancy and the Puerperium.

Of sixteen cases of the other toxæmias, six were regarded as preventible. In three cases in which death from *hyperemesis gravidarum* was regarded as preventible, the committee considered the choice of method of emptying the uterus was at fault. In one case subtotal hysterectomy was performed. One patient at three months had the cervix dilated with Hegar's dilators, the membranes were ruptured and then hysterectomy was performed. The third patient, also at three months, had the cervix forcibly dilated with Hegar's dilators and then the uterus was curetted. The committee considered that the method of choice in such severe toxæmias is that a slow dilatation with tents should be carried out so that the patient will abort herself later, or that the debris should be removed with a finger or ovum forceps and that no curettage should be done, or that hysterotomy should be performed where all facilities are available. One death recorded from acute yellow atrophy was regarded as non-preventible.

HÆMORRHAGE OF CHILDBIRTH (CAUSE 146) AND HÆMORRHAGE OF PREGNANCY (CAUSE 143).

Thirty-six mothers died from hæmorrhage in the years 1940 to 1943.

In the year 1940 there were eight deaths, in 1941 there were eleven deaths, in 1942 there were eight deaths, and in 1943 were were nine deaths, a total of 36.

These included all the cases in which hæmorrhage occurred before, during or after labour, but did not include any deaths from ectopic gestation or abortion. The 36 cases were classified as follows: *placenta prævia*, 4; accidental hæmorrhage, 7; post-partum hæmorrhage, 25.

The age at which death occurred is shown in Table VIII.

TABLE VIII.

Age Group in which Death Occurred.	Number of Deaths.
15 to 19	0
20 to 24	7
25 to 29	10
30 to 34	6
35 to 39	10
40 to 44	3
45 to 49	0
Total ..	36

Parity.—Eleven deaths occurred in the first pregnancy, ten deaths occurred in the second pregnancy, three occurred in the third pregnancy, one in the fourth, one in the fifth, two in the sixth and one in the tenth pregnancy. In regard to seven deaths there was no record of parity.

Primary Avoidable Factors.—Twenty-four deaths were considered to have been non-preventible and twelve to have been preventible.

Of the twelve preventible deaths, eight were regarded as due to error in judgement on the part of the doctor, and three of these were attributed to delay in arranging for a blood transfusion. One death was due to the refusal of the patient to submit to an operation for removal of a large fibroid tumour diagnosed early in pregnancy; one was regarded as due to the patient's own neglect; one was regarded as due to inadequate pre-natal care on the part of the mother.

Blood Transfusion.—Blood transfusion, one or more, was given in sixteen cases, and in twenty cases no transfusion was given. In one case of the latter group, the arrangements had been made, but the blood would not flow into the veins, and in one the patient died before the mobile blood transfusion unit arrived. The number of cases in which no transfusion was given was six in 1940, seven in 1941, three in 1942 and four in 1943.

Children.—Twenty-four babies were born alive, including three lots of twins; fifteen babies were stillborn (one of which was macerated).

Ante-Partum Hæmorrhage.

There were two cases of central *placenta prævia* and two cases of lateral *placenta prævia*.

Lateral Placenta Prævia.

One of the cases of lateral *placenta prævia* was the following.

The patient, aged thirty-six years, was about thirty-nine weeks pregnant in her second pregnancy. Her first pregnancy had occurred nineteen years ago, and then she had a twelve hours labour, with a vertex presentation and an adherent placenta. The present labour was complicated by primary inertia and was accompanied by moderate and ante-

partum and intra-partum hæmorrhage; with episiotomy and low forceps a dead child was delivered. Immediate severe post-partum hæmorrhage occurred, manual removal of placenta was done and the usual treatment was carried out. Blood transfusion was started, but the patient's condition suddenly went off. She died. She had visited an abortionist when two months pregnant, and having had a catheter inserted, thought pregnancy had been terminated.

Central Placenta Prævia.

The two cases of central *placenta prævia* were the following.

The patient, aged thirty-three years, was thirty-six weeks pregnant in her first pregnancy. She had slight bleeding and a Cæsarean section was done. A live male child (eight pounds) was delivered; then the patient collapsed and died about an hour later. Saline solution had been given.

The patient, aged twenty-four years, was thirty-four weeks pregnant in her second pregnancy. She had bleeding on and off during the whole pregnancy, particularly during the last two months. Bleeding began at midnight and pains at 1 a.m., but the doctor was not sent for till 3 a.m. The patient was taken to a private hospital, vaginal packing was inserted, and then the patient was transferred to a public hospital and admitted in a semi-conscious state with extreme pallor and exsanguinated. A blood transfusion by the drip method was given, and when her condition had improved the placenta was perforated, version was performed and a leg was brought down and baby delivered by the breech. The placenta came away with the baby. The uterus contracted well, no further bleeding occurred, but the temperature rose to 106° F. The patient had oscillating eyeballs, pinpoint pupils and a positive Babinski reflex. She died. Post-mortem examination revealed a pituitary gland of normal size, but in the anterior lobe there was an area of necrosis, irregularly replacing the gland substance, up to three millimetres in width. The stalk appeared very hæmorrhagic. No pathological changes were found in the basal ganglia of the cortex, in the mid-brain or in the cerebellum. No thrombosis or hæmorrhage was seen in any area. No other gross changes were present.

The intra-natal care in these four cases was as follows: one patient was delivered at a private hospital; two patients were delivered at a public hospital; one patient was treated by her own doctor and was admitted to a public hospital in a semi-conscious state.

Accidental Hæmorrhage.

Seven mothers died from accidental hæmorrhage. Four patients had signs of toxæmia, raised blood pressure, albuminuria and œdema. In three cases there was no record of these even having been looked for.

Ages.—One died aged twenty-two years, one died aged thirty-three, two died aged thirty-four, one died aged thirty-eight, and two died aged forty years.

Parity.—Two patients died in the first pregnancy, two died in the second pregnancy, one died in the fifth, one in the sixth and one in the tenth pregnancy.

Period of Gestation.—One patient died at the thirty-sixth week, two patients died at the thirty-eighth week, three died at the fortieth week, and one died at the forty-first week.

Place of Confinement.—Four patients were confined in public hospitals, two patients were confined in private hospitals, and one patient was transferred to a public hospital.

Treatment.—One patient was delivered by Cæsarean hysterectomy. Two patients had a natural delivery. In one case the membranes were artificially ruptured and the low forceps operation was performed.

One patient who had had five previous normal labours was admitted to hospital almost moribund, with the os "three fingers" dilated. Willett's scalp traction forceps were applied, transfusion was given and the condition improved after a high forceps delivery; the patient then collapsed, and while another transfusion was being given, died.

One patient had artificial rupture of the membranes; scalp traction was applied, a transfusion was given, an easy low forceps operation was performed, and the placenta was expressed by pressure on the abdomen.

One patient had a medical induction given, and had an excessive ante-partum hæmorrhage; half an hour later labour pains started, and natural delivery took place twenty minutes later.

Post-Partum Hæmorrhage.

Twenty-five patients died from post-partum hæmorrhage. The age at death is set out in Table IX.

TABLE IX.

Age Group in which Death Occurred.	Number of Deaths.
15 to 19	0
20 to 24	5
25 to 29	10
30 to 34	2
35 to 39	7
40 to 44	1
45 to 49	0
Total ..	25

Parity.—Eight deaths occurred in the first pregnancy, seven deaths occurred in the second pregnancy, two occurred in the third pregnancy, one occurred in the fourth, one occurred in the sixth, and six deaths occurred with no record of other pregnancy.

Complications.—Complications occurred as shown in the following list: pulmonary embolism, one case; adherent placenta, eight cases; toxæmia, five cases; shock, eleven cases; ruptured uterus, one case; fibroids, two cases; precipitate labour, one case; hydrocephaly, one case; hydramnios, one case.

Forceps delivery was used in eight cases; manual removal of the placenta was carried out in twelve cases; twins occurred in three cases; perforation of the head was performed once.

In some cases one or more conditions existed at the same time; therefore the total is not shown.

One patient had an ante-partum hæmorrhage, a fibroid uterus, breech presentation, premature rupture of membranes, and a manual removal of the placenta because of excessive post-partum hæmorrhage.

One patient had *placenta prævia* complicating her first pregnancy, which was terminated at the seventh month. She had irregular menstrual periods from then till the last pregnancy. She had occasional dark brown vaginal discharge during the pregnancy. She had chorea and rheumatic fever as a child.

One patient, whose inclusion is open to question, had an interesting history. Labour at her first confinement had been very prolonged. She had primary uterine inertia and the fœtus was in the occipito-posterior position. After about ninety hours of labour favourable rotation occurred and she was delivered easily with forceps. She had a history of thyreotoxicosis and a mild degree of cardiac insufficiency. The present labour appeared to be progressing favourably, and while she was having very strong uterine contractions she suddenly collapsed. The honorary obstetrician saw her soon afterwards and found her seriously shocked with very rapid feeble pulse; no fœtal heart sounds were audible. The baby was easily delivered, as it was practically on the perineum. The uterus contracted down normally and there was no external bleeding. The placenta did not come away, and it was felt that she would not stand attempts to remove it manually. No vaginal bleeding occurred, and after her condition improved, her abdomen was opened under local anæsthesia, through a small incision to exclude intra-peritoneal hæmorrhage. Free blood was not present, but a large hæmatoma was observed anteriorly under the peritoneum in the region of the lower uterine segment. She was not fit to stand hysterectomy. Transfusion was given, but the patient died some hours later. After the patient's death the incision was reopened and it was found that the cervix had split spontaneously and opened up the broad ligament on the left side. The placenta had plugged this rupture, preventing external bleeding, and the hæmorrhage had gone on probably intermittently and retroperitoneally, stripping up more and more of the peritoneum until death supervened. Removal of the placenta would probably have revealed the state of affairs, but at no time was she fit to stand any manipulation.

Preventible Deaths.—In 1940 there were two preventible deaths, in 1941 there were six, in 1942 there was one, and in 1943 there were three.

Two mothers suffering from hæmorrhage died undelivered; one death was considered to be preventible (Cause 143).

Conclusion.

In reviewing all the deaths due to hæmorrhage, several factors seem worthy of comment.

1. By far the greater number of deaths were due to post-partum hæmorrhage. The need for early recognition and adequate treatment of hæmorrhage occurring during the third stage of labour requires frequent emphasis. Patients with abnormal conditions should be carefully and constantly watched. Indeed, preparation should be made for post-partum hæmorrhage in the treatment of all patients with any abnormality. In many of the cases under review, although blood transfusion was given, it was often only after some hours. Even after the patient's admission to hospital in some cases delay of some hours occurred. The speeding up of this seems desirable.

Delay in Blood Transfusion.

Two cases illustrating delay in blood transfusion may be quoted.

CASE 7.—The patient, aged thirty-two years, had one miscarriage at two months in 1941 and a miscarriage at six months with severe post-partum hæmorrhage in 1942. In the present pregnancy transverse presentation was present and the measurements were small. The patient was carefully supervised by her own doctor and went into a metropolitan obstetric hospital as a private patient for induction of labour at thirty-six weeks. External version was performed. Four hours later, with the cord prolapsed and the cervix fully dilated, an internal version was performed, the presentation being changed from a shoulder to a breech. A stillborn infant was delivered without effort, and the third stage was normal and completed within half an hour after delivery. An hour later the patient had a copious post-partum hæmorrhage and became profoundly shocked. It was two hours before a blood transfusion could be arranged and the patient died before it was completed.

CASE 46.—The patient was aged twenty-four years and a *primipara*. She attended a hospital out-patient department regularly. She had normal measurements and presentation and the position of the fœtus was left occipito-anterior. After a normal full-time labour of eight hours the placenta was expelled naturally. Half an hour later a hæmorrhage occurred with pulse rising and of poor quality; an intravenous injection of saline solution was given, but it was not until five hours after the hæmorrhage that a blood transfusion was given. She died four hours after the transfusion.

2. The importance of any hæmorrhage whatsoever in the last twelve weeks of pregnancy needs stressing continuously. All patients with hæmorrhage of this kind should be admitted to hospital as soon as possible. No vaginal examinations should be made in the home. Even in hospital vaginal examinations should be restricted, and, if necessary, done in a properly equipped theatre with preparations ready for immediate treatment should bleeding occur.

3. The case histories revealed that toxæmia as a complication of pregnancy occurs frequently, and some of the patients had symptoms and signs of toxæmia for some considerable time before labour started or delivery was attempted. The danger of the occurrence of hæmorrhage in toxæmia is a very real one and needs to be kept in mind.

4. The great majority of the deaths occurred among patients over twenty-five years of age. Twenty-nine patients were twenty-five years and over. The ages of patients with *placenta prævia* were 24, 33, 35 and 36 years. Of the patients with accidental hæmorrhage, one was twenty-two years of age and all the rest were over thirty-three years. In the post-partum group twenty were twenty-five years of age and over.

5. Some of the patients with accidental hæmorrhage appeared to have suffered from obstetric over-treatment. Possibly, in a few instances, treatment directed to the combating of shock and blood loss alone might have had happier results. It is realized, however, that in these cases one is often dealing with a desperate condition in which no treatment is of any avail.

INFECTION DURING CHILDBIRTH AND THE PUERPERIUM (CAUSE 147).

There was a total of 82 deaths from infection during childbirth and the puerperium in the years 1940 to 1943 inclusive. Eighteen occurred in 1940, 21 in 1941, 20 in 1942 and 23 in 1943.

This group includes all deaths due to sepsis according to the international classification which has been in use since 1940.

(*a*) Puerperal infection, that is, septicæmia resulting from infection of the genital tract or its annexa, puerperal pyelonephritis, pyonephrosis *et cetera*.

(*b*) Puerperal thrombophlebitis (6 of total 82).

(*c*) Puerperal embolism and sudden death. These conditions embracing 21 of the total of 82 deaths in this group were not included in the previous ten-year classification.

In the investigation of these cases it was found that sepsis occurred in the following circumstances (in some cases one or more conditions existed at the same time, hence no total is shown):

Normal labour	27
Cæsarean section	31
Forceps delivery	16
Manual removal of placenta	9
Surgical induction of labour	9
Hysterectomy	4
Craniotomy	6
Other complications, for example, prolonged labour, hæmorrhage *et cetera*	22

Thus quite a number of deaths followed normal labour (27); in some cases death followed Cæsarean section (31); and in others the clinical picture is one of a mother exhausted by long complicated and difficult labour and accompanying blood loss, when the stage is set for the patient to be overwhelmed by infection.

The important consideration in each of these clinical entities is that in many cases, in the committee's opinion, proper consideration of the underlying factors of puerperal infection and consequent management would have prevented many of the deaths. For example, the deaths following normal labours approximate one-quarter of the total. Only when all cases of puerperal pyrexia are investigated by lochial swabbings as soon as pyrexia occurs will it be possible for the medical practitioner to adopt the correct treatment by the most effective type of sulphonamide or other medication.

The simple process of bacteriological examinations of the lochial or vaginal swabbing would permit the correct treatment to be instigated at the invasion stage without waiting till the patient is overwhelmed by the infecting organism. The regulations under the *Nurses' Registration Act*, specially designed to control puerperal infection, enforce the notification of puerperal pyrexia when a temperature of 100·4° F. occurs on more than one occasion, but this may be too late for effective treatment. The number of cases in which a bacteriological examination was made is shown in Table X.

TABLE X.

Year.	Total Cases.	Number Investigated.
1940	18	11
1941	21	6
1942	20	10
1943	23	8
Total	82	35

In a number of instances in this series death occurred before bacteriological examination could have been of any value. The organisms isolated are shown in Table XI.

TABLE XI.

Organisms Isolated in Lochial and Vaginal Swabbings and Blood Cultures.[1]

Year.	Hæmolytic Streptococci.	*Staphylococcus Albus.*	*Bacillus Coli Communis.*	Non-Hæmolytic Streptococci, *et cetera.*
1940	6	—	2	3
1941	2	—	2	2
1942	3	1	4	5
1943	2	3	4	4
Totals	13	4	12	14

[1] Frequently more than one organism was reported from the same case.

It will be noted that 35 out of 82 cases were investigated bacteriologically, that is, 42%, and even in these cases many investigations were carried out only after the patient had been transferred to a public hospital, and therefore the investigation was too late to allow proper treatment to be instituted; no effective search was made, in most instances, to discover the source of infection.

More detailed bacteriological examination is required nowadays than the mere recognition of the hæmolytic streptococcus, and in addition the prompt examination of sources of infection should be undertaken in all cases.

The *Nurses' Registration Act* enforces the exclusion from obstetric practice of any nurse who is suffering from infection or who is attending patients suffering from infection. All attendants suffering from coughs, colds, sinusitis *otitis media* or any other form of infection should have throat and nose swabbings taken to exclude any possibility of air-borne infection and so prevent further patients from becoming infected. No visitors suffering from such maladies should be allowed to visit the patient.

Of the organisms isolated in blood cultures, approximately 69% were hæmolytic streptococci, 10% were *Bacillus coli communis*, 10% were *Bacillus welchii* and other organisms such as *Staphylococcus aureus* and *albus* and anaerobic staphylococci *et cetera*.

It is well known that hæmolytic streptococci are organisms of the highest air-borne infectivity, and in particular hæmolytic streptococcus Group A. This is an additional reason for the committee's concern at the lack of early investigation of the patient and contacts, in fact, at the entire lack of bacteriological investigations in many instances. Actually it was found in some cases that in an endeavour to avoid the obligations under the *Nurses' Registration Act* and *Private Hospitals Act*, diagnoses of pneumonia, influenza *et cetera* were forwarded to the Department of Public Health, the patient's chance of recovery thus being prejudiced. It is admitted that the conditions under the *Private Hospitals Act* for the control of puerperal infection are stringent, but each case is decided on its merits, and when early bacteriological investigation has been made, many of the ensuing difficulties can be avoided. It was noted in a series of deaths from sepsis, occurring at one hospital after Cæsarean section, that some error in technique must exist in the theatre procedure. The committee, through the Director-General of Public Health, communicated with the hospital concerned and suggested that an investigation of the technique and procedure of the theatre might be undertaken. Since that time there have been no deaths from sepsis following Cæsarean section.

In types of infection arising when the patient was exhausted by long labour, instrumental or operative delivery and blood loss, it was considered that a blood transfusion should have been given, and, if necessary, repeated, particularly in cases in which a manual removal of the placenta had been done.

The incidence of febrile and non-febrile cases of embolism and sudden death in this series from 1940 to 1943 is 21 of the total 82.

There has been great improvement in the treatment of sepsis since the introduction of sulphonamides in 1937, and it may be anticipated that with (*a*) the increase in the knowledge of the bacteriology of puerperal infection, (*b*) the early and full investigation of each case and (*c*) the consequent early institution of proper treatment, there will be further reduction in the number of deaths due to puerperal infection.

A pamphlet for the information and guidance of medical practitioners and nurses engaged in obstetric practice was published and circulated in 1941 to all registered medical practitioners and private hospitals licensed for lying-in patients in New South Wales.

Time of Onset of Pyrexia.—The time of onset of pyrexia is shown in Table XII.

TABLE XII.

Time of Onset.	Normal Delivery.	Abnormal Delivery.
Prior to delivery	—	2
After delivery—		
Up to 24 hours	9	23
24 to 36 hours	3	9
36 to 48 hours	3	4
2 to 3 days	5	4
3 to 4 days	—	3
4 to 6 days	2	—
6 to 7 days	1	—
7 to 14 days	6	3
Over 14 days	—	1
Not known	1	3
Total	30	52

Seasonal Incidence.—Another factor, seasonal incidence, has to be noted, but does not show any special variation except that the lowest incidence is in the second quarter of the year, April, May and June, usually months of mild climatic conditions.

Month in which Death Occurred.—The months in which the deaths occurred are shown in Table XIII.

TABLE XIII.

Month.	Number in Each Month.	Number in Each Quarter.
January	6	22
February	4	
March	12	
April	4	14
May	4	
June	6	
July	10	26
August	9	
September	7	
October	10	20
November	6	
December	4	
Total	82	82

Parity.—Parity also appears to have little significance in the occurrence of sepsis. Of the 82 patients who died, 40 were *primiparæ* and 39 were *multiparæ*; in three cases the information was not available.

Age at Death.—The age at death is shown in Table XIV. The highest incidence of death is in the 30 to 34 age group, but is possibly influenced by the large number at risk.

TABLE XIV.

Age Group. (Years.)	Number of Deaths.
15 to 19	2
20 to 24	13
25 to 29	22
30 to 34	24
35 to 39	12
40 to 44	7
45 and over	2
Total	82

Conclusion.

Theoretically deaths from puerperal infection are considered as a rule to be preventible, but the committee is of opinion that from a practical point of view it is not possible for medical attendants to prevent infection in all cases. The errors in management, however, are classed as follows: (i) lack of bacteriological investigation; (ii) lack of early bacteriological investigation; (iii) lack of replacement of blood loss; (iv) error in aseptic technique; (v) failure to estimate the degree of disproportion or contracted pelvis; (vi) failure to seek a consultant's opinion in cases of long labour; (vii) defective pre-natal care.

Of those cases indicating errors of management and those in which it was considered impossible to prevent infection, the numbers are as shown in Table XV.

TABLE XV.

Year.	Preventible Infections.	Non-Preventible Infections.	Total.
1940	12	6	18
1941	4	17	21
1942	12	8	20
1943	14	9	23
Total	42	40	82

For inadequate prenatal care the patient, the medical attendant or both were responsible. The lack of care is dissected in Table XVI.

TABLE XVI.

Year.	Patient Responsible.	Attendant Responsible.	Both Responsible.	Total.
1940 ..	4	1	1	6
1941 ..	3	—	—	3
1942 ..	1	1	—	2
1943 ..	2	1	1	4
Total ..	10	3	2	15

Case Histories.

CASE 6, CAUSE 147A.—The patient was a *primipara*, aged twenty-three years. The breech was unrecognized until labour had progressed for several hours. The breech became impacted and the patient was transferred from private to public hospital. After thirty-five hours a nine pound still-born fœtus was delivered, and this was followed by a manual removal of the placenta. The patient was very shocked and failed to respond to treatment by intravenous injection of gum saline solution. Twelve hours after delivery she suddenly died and a hæmatoma of the broad ligament and *Bacillus welchii* infection were suspected. No pathological tests were performed.

CASE 8, CAUSE 147A.—The patient, a *multipara*, aged thirty-four years, was confined normally at a private hospital. She complained of rigors on the fourth and sixth days of the puerperium. Her temperature was 100·4° F. on the sixth, seventh and eighth days and the nurse in charge failed to report this fact and to call medical attention. The patient was discharged from hospital on the twelfth day, feeling very ill. She was then seen by a doctor who had her admitted to a public hospital immediately. Hæmolytic streptococci were found in the cervical swab and were also grown in a blood culture, and in spite of vigorous treatment the patient died.

CASE 10, CAUSE 147A.—The patient, a *multipara*, aged twenty-nine years, had sought no pre-natal care at all. She lived in extremely poor circumstances and was generally debilitated. She was delivered of living twins in her own home, which was a dirty, neglected hovel. She was admitted to hospital with raised temperature, and a cervical swab revealed hæmolytic streptococci. This organism was also cultured from her throat and blood stream. Despite treatment she died three days after admission to hospital.

CASE 33, CAUSE 147A.—The patient, aged thirty-nine years, was a *primipara* and an achondroplastic. X-ray examination revealed a very small pelvis and Cæsarean section was decided upon when labour commenced. A classical operation was performed after two hours of labour and the patient's condition was satisfactory until the sixth day, when her abdomen became distended and she vomited. Her condition deteriorated and she died suddenly on the eighth day. At a post-mortem examination general peritonitis was found. No bacteriological investigation was carried out.

CASE 63, CAUSE 147A.—The patient was a *primipara*, aged twenty-three years. Her pregnancy was uneventful and she was delivered by classical Cæsarean section of living twins. The operation was done because labour was not progressing well and pyrexia and albuminuria were present. The patient's temperature was elevated on the second day. Sulphanilamide was given in large doses. Though several attempts were made cultures could not be grown from the blood. The patient's condition was not good and her colour was noted to be very pale. A gross degree of anæmia and granulopenia were found and the patient was transferred to a public hospital for treatment of this condition. In spite of active treatment she died six weeks later.

CASE 89, CAUSE 147A.—The patient, aged forty-three years, had a history of previous amputation of the cervix. After being in labour for six hours a classical Cæsarean section was performed. The patient's condition was satisfactory until the seventh day, when her abdomen was distended and vomiting occurred, and the patient complained of abdominal pain. Her condition became progressively worse and she died. General peritonitis with enormous distension of the intestines was found at autopsy. No pathological tests were performed.

CASE 61, CAUSE 147B.—The patient, a *primipara*, aged thirty-two years, had toxæmia during the last month of pregnancy. Twins were delivered easily. Femoral thrombosis developed in one leg on the eighth day and became bilateral later. A month after confinement the patient's condition was very unsatisfactory and she was transferred to a public hospital. Four days later she died.

CASE 55, CAUSE 147C.—The patient was a *primipara*, aged thirty-two years. Easy labour was completed by the low forceps operation. The patient's colour was poor after the third stage. Two hours after delivery she complained of pain in the chest, her pulse rate was increased and her colour was poor. A further attack half an hour later was immediately fatal.

ACCIDENTS OF PREGNANCY AND CHILDBIRTH.

Accidents of pregnancy and childbirth are divided into two groups: (i) accidents of pregnancy including ectopic gestation (Cause 142) and (ii) accidents of childbirth (Cause 149). The latter are divided into (*a*) Cæsarean section, (*b*) surgical operations and instrumental delivery, and (*c*) obstetric shock *et cetera*.

Ectopic Gestation.

Yearly Comparison.—In 1940, seven deaths followed ectopic gestation, in 1941 there were four deaths, in 1942 there were eight, and in 1943, six—a total of 25.

Parity.—Two women had had one previous pregnancy, three women had had two previous pregnancies, four women had had three or more previous pregnancies; in sixteen cases there is no record of previous pregnancies.

Cause of Death.—The causes of death were as follows: hæmorrhage, sixteen cases; intestinal obstruction, one case; pulmonary embolism, three cases; sepsis, three cases; pneumonia, one case; cerebral thrombosis, one case.

Blood Transfusion.—Blood transfusion was given in ten cases. When it is recalled that in sixteen cases the cause of death was hæmorrhage, comment on the desirability of greater use of this life-saving measure cannot be too strong.

Preventible Deaths.—On the information supplied to the committee, it was considered that thirteen cases could be classified as preventible deaths. The chief primary avoidable factor was lack of recognition of the typical history and failure to diagnose the condition sufficiently early to avoid the fatal issue.

Abdominal Pregnancies.—Abdominal pregnancies are included in these group of causes. On account of the peculiar nature of this condition and the necessity for adequate treatment, a special statement issued by the committee was published in THE MEDICAL JOURNAL OF AUSTRALIA of January 1, 1944.

Cæsarean Section.

Throughout the survey the number of Cæsarean sections was recorded as follows: 1940, 11; 1941, 12; 1942, 16; 1943, 14—a total of 53.

Most of the 53 Cæsarean sections were done by obstetric consultants, some by general surgeons and others by general practitioners. Thirty-one of the patients died from infection after Cæsarean section and the deaths were therefore classified as due to infection.

Type of Section.—The type of Cæsarean section performed was first recorded during 1942. In the opinion of the committee the extraperitoneal type is preferable when it is reasonable to suspect the possibility of infection. Of the Cæsarean sections associated with maternal deaths in 1943, six were deaths from infection subsequent to the classical type of operation, and in all only three extraperitoneal operations were performed.

Some of the Indications.—The following are some of the indications recorded: central *placenta prævia*, contracted pelvis, disproportion and/or malpresentation, ruptured uterus, failed forceps, toxæmia.

Cæsarean section is classified as a distinct entity only when it follows obstructed labour or the discovery of a contracted pelvis. The number thus classified as deaths due to Cæsarean section during the four years was as follows: 1940, three deaths; 1941, four deaths; 1942, six deaths; 1943, six deaths. Of these, seven were considered to be preventible.

From the detailed information before the committee it was evident that in the majority of the cases there was error in judgement or management and the cause of obstruction had been diagnosed too late. Frequently the patient had been "days" in labour before a consultant was called. This is a matter causing grave concern to the committee, as there is no economic reason why a consultant could not be called, such a consultant being provided by the free service as arranged by the Department of Public Health. In one case a patient was five days in labour before a consultant was called.

Parity.—Fifteen of the patients were *primiparæ* and four were *multiparæ*.

Age Groups.—The age groups are shown in Table XVII.

TABLE XVII.

Age Group. (Years.)	Number of Deaths.
20 to 24	1
25 to 29	6
30 to 34	6
35 to 39	2
40 to 44	4
Total ..	19

Time of Death following Operation.—The length of time after operation at which death occurred is shown in Table XVIII.

TABLE XVIII.

Length of Time After Operation.	Number of Deaths.
Immediately afterwards	7
Within 24 hours	4
24 to 48 hours	2
48 hours to 7 days	5
7 to 14 days	1
Total	19

Case Histories.

In the following case consultation was arranged too late.

CASE 15.—The patient was a *primipara*, aged twenty-nine years. Pregnancy was normal; the measurements were considered to be normal with no evidence of dystocia. Labour began on Monday in a private hospital; light ineffective pains occurred during Tuesday; strong pains occurred during Wednesday; a consultant was called on Thursday. The patient was removed to a public obstetric hospital and died shortly after Cæsarean section.

An error in judgement of the degree of disproportion and a consequent error in management are shown in the following case.

CASE 17.—The patient, a *primipara*, aged twenty-eight years, attended the out-patient department regularly and was admitted to hospital at the fortieth week. The vertex presented; measurements were normal; the head was not fully engaged. Labour began at 6 a.m. and continued with unsatisfactory progress until 6 p.m. Two days later, after several vaginal examinations had been made, a classical Cæsarean section was performed and a live infant was delivered. The patient's condition gradually deteriorated and she died in spite of treatment six days later from a paralytic ileus.

Negligence on the part of the mother and in addition error in judgement on the part of the doctor are shown in the following case.

CASE 99.—The patient was a *multipara*, in her eighth pregnancy. She had failed to seek pre-natal care or to arrange for her confinement. She called in an elderly untrained nurse (who was registered as a midwife when registration was first enforced). The nurse examined the patient several times and tried repeatedly to get the services of various doctors in the locality. As her condition became worse the nurse advised the relatives to move her to hospital. She was removed to hospital at 8 p.m. after being in labour since 6 a.m. At the hospital forceps delivery was attempted at 9 p.m., but failed. She was then given a quarter of a grain of morphine and she slept fitfully during the night. Next day at midday, after thirty hours in labour, numerous vaginal examinations by the visiting midwife, "failed forceps" in the hospital, a classical Cæsarean section was performed and a stillborn infant delivered. The patient died three hours later.

Surgical Operations or Instrumental Delivery.

There were nine deaths as the result of instrumental delivery or other surgical manipulation, for example, craniotomy, version *et cetera*. Of these, five were regarded as preventible and due to error in judgement in the management of the case, for example, a consultant called too late to be useful, incorrect estimation of disproportion and in the decision to attempt forceps delivery *et cetera*.

Case Histories.

In the following case there was failure to give due consideration to the previous history.

CASE 8.—The patient, aged thirty-three years, was in her eighth pregnancy. She attended the out-patient department regularly; there was a history of three difficult instrumental deliveries. The patient was admitted to hospital at forty weeks. She was in labour, and continued in labour for thirty-six hours until the delivery by difficult and high application of forceps of a stillborn infant weighing nine pounds. After delivery the patient collapsed, but responded to transfusion and other medical treatment. Later her condition deteriorated and twelve hours after the birth of the infant she died.

The following case provides an example of unskilled and untimely interference.

CASE 90.—The patient, a *primipara*, aged thirty-nine years, attended the out-patient department regularly and was admitted to an obstetric hospital at forty weeks for medical induction of labour. Five and a half hours after the commencement of labour, forceps were applied by the resident medical officer and a live infant weighing seven pounds was delivered. Immediately after delivery the patient became profoundly shocked. A "moderate" degree of hæmorrhage continued during the third stage; the placenta was expelled thirty-five minutes later. The honorary medical officer was then called and it was found that there was an extensive tear of the cervix and a second degree tear of the perineum. The cervix was sutured under general anæsthesia and a blood transfusion was given, but the patient's condition continued to deteriorate in spite of treatment and she died five hours after the infant was born.

The following is an example of failure to call a consultant until too late.

CASE 2.—The patient, a *primipara*, aged thirty-one years, attended her own doctor for regular pre-natal care. She was admitted to private hospital at forty weeks, in labour. The position was right occipito-posterior and measurements were regarded as normal. Labour continued for sixty-eight hours; during part of this time the pains were weak and ineffective. The doctor in charge of the case found the cervix three-quarters dilated and decided to dilate the cervix manually under gas and oxygen anæsthesia; high forceps were then applied, and after thirty minutes' hard pulling, delivery was not effected. The patient suddenly collapsed and a consultant was called. When the consultant arrived he found the patient moribund and considered her condition to be beyond any surgical intervention or other aid.

The following two cases are examples of failure to recognize the degree of disproportion.

CASE 19.—The patient was a *primipara*, aged twenty-eight years. She attended the out-patient department regularly and a contracted pelvis was diagnosed. The patient was admitted in labour at thirty-six weeks; after forty-eight hours in labour with a persistent occipito-posterior position, forceps delivery was attempted unsuccessfully. Internal version and craniotomy were then performed; the patient collapsed shortly afterwards and died.

CASE 29.—The patient, a *primipara*, aged twenty-three years, attended the out-patient department regularly; the measurements were regarded as normal; the vertex presented; the position was left occipito-posterior. The head was engaging and the patient was admitted to hospital at forty weeks. Three unsuccessful medical inductions of labour were attempted. The patient was forty hours in labour and five vaginal examinations were made. High forceps delivery was attempted, but failed. An internal version breech delivery with craniotomy of the after-coming head was performed. The third stage was complicated by failure of the placenta to separate, requiring manual removal after two hours. The patient's condition was critical, and despite treatment she died two days later.

Obstetric Shock.

A careful study of the detailed histories of many of these deaths indicates that some other underlying factors have been present. In many cases the committee was of the opinion that the death had been due to hæmorrhage, and in some cases rupture of the uterus; in one case the patient appeared to present symptoms of toxæmic pulmonary œdema.

The committee, however, could not establish the alternative causes in the absence of post-mortem evidence or of knowledge of the actual clinical state.

There were twenty deaths in this group of causes, and of these, five were considered to be preventible; two were due to negligence on the part of the mother in not following instructions and three were due to an error of judgement in the management of the case.

Case Histories.

In the following three cases death was due to an error in judgement.

CASE 13.—The patient was a *primipara*, aged thirty-four years. She attended the out-patient department regularly and was admitted to hospital in the thirty-ninth week for medical induction of labour on account of hypertension. The position was right occipito-anterior and the head fully engaged. The pains began and were at first irregular and ineffective; when they became stronger the mother rapidly became exhausted. After thirty-nine hours of labour the cervix was fully dilated and forceps delivery was attempted under ether anæsthesia, but failed. Craniotomy was performed and the baby extracted; three-quarters of an hour later manual removal of the placenta was carried out. A blood transfusion was then given, and in spite of further treatment the patient died within an hour.

CASE 107.—The patient, a *primipara*, aged twenty-one years, had regular pre-natal supervision. She was admitted to a private hospital for medical induction of labour; twenty-four hours later she came into labour. After eighty-four hours she was transferred to a public maternity hospital where a Cæsarean section was performed. There was considerable hæmorrhage during the operation and a stillborn infant was delivered. The patient died directly after the wound was closed.

CASE 97.—The patient was thirty-four years of age; it was her sixth confinement. There was a history of prolonged and difficult labour with the first confinement and of a Cæsarean section for *placenta prævia* with the fifth confinement. The mother attended the out-patient department regularly and was admitted to hospital for observation before the onset of labour. The patient came into labour at 1.30 a.m. and was allowed to continue in irregular labour for two days. After fifty-three hours she developed tenderness of the abdomen; the following day a laparotomy was performed and the uterus was found to be ruptured; subtotal hysterectomy was performed. She died shortly afterwards.

In the following two cases death was due to negligence on the part of the patient.

CASE 59.—The patient was thirty-nine years of age and it was her eighth pregnancy. She had not sought any ante-natal care and was admitted to the obstetric hospital after rupture of the membranes. No previous visit had been paid by her to a doctor or a hospital. Malpresentation was present and a transverse lie was diagnosed. Internal version and breech delivery were performed. The third stage was normal, but the patient was exhausted and her condition continued to deteriorate and she died within an hour.

CASE 91.—The patient was thirty-one years of age and it was her sixth pregnancy. She had not sought ante-natal care, but called in a local midwife when pains began at 9 a.m. The nurse remained with her and at midday the infant was delivered to the shoulders, but the nurse failed to deliver the after-coming head. No doctor could be located and the police were called in to remove her to an obstetric hospital. She arrived in a serious condition; a meningococle was diagnosed and the head was perforated. The lower uterine segment was found to be ruptured, and in spite of blood transfusion she died within an hour.

OTHER DISEASES AND ACCIDENTS OF PREGNANCY AND CHILDBIRTH.

Under the heading of "Other Diseases and Accidents of Childbirth" are included deaths due to Cause 145 and Cause 150. In the first of these groups there were five cases (two preventible deaths and three non-preventible); in the second group there were two cases (both non-preventible deaths).

ABORTION.

Definition.

The term abortion employed throughout this analysis means the expulsion of a product of conception from the uterus at any period up to the twenty-eighth week of pregnancy.

Incidence of Abortion.

Reliable figures as to the incidence of abortion are not obtainable because neither the pregnant state nor abortion is a notifiable condition. In some countries abortion has been made registrable, but even in these circumstances it is difficult to glean in any way the complete truth as to its frequency because illegal abortions are obviously never registered. It is a depressing fact that these constitute the cause of the big majority of deaths due to abortion. It is not irrational to assume, therefore, that the number of non-fatal illegal abortions must be correspondingly considerable. In evidence submitted to the League of Nations in 1924 the frequency of abortions in Germany was estimated to be as high as two to every three confinements; while in France the proportion was estimated at practically one abortion to one confinement. Assuming the state of affairs to be even considerably better than this in our own country, the incidence of abortion must be regarded as a factor of serious import to the national birth rate.

Death due to Abortion.

This analysis deals specifically with deaths due to abortion.

In the metropolis of Sydney during the period 1940, 1941, 1942 and 1943 the position was as follows:

Deaths following spontaneous abortion	40
Deaths following criminal abortion	101
Deaths due to sepsis	125
Deaths due to other cause	16

Deaths due to Post-Abortive Sepsis.

One hundred and twenty-five women died from sepsis following abortion.

Ante-natal supervision, which has proved such a potent factor in reducing maternal deaths from such complications of pregnancy and labour as toxæmia, mal-presentation *et cetera*, offers little hope in the field of abortion. In the majority of cases abortion occurs before the sixteenth week, during which period a great many women, unfortunately, do not come for supervision even though this may have been their intention.

It will be interesting to see if the obtaining of ante-natal supervision at an earlier date under present conditions of shortage of obstetric beds and the consequent difficulty in securing hospital accommodation for the ultimate confinement will produce any improvement. It will probably be slight because the majority of the deaths due to post-abortive sepsis occur in criminal abortions where supervision would be as unsought as the pregnancy is unwelcome. And as the pregnancy is unwelcome in these cases any form of orthodox medical or nursing advice is sought only after the patient or her relatives are convinced that the patient is dangerously ill.

Deaths due to Non-Septic Abortion.

Deaths due to non-septic abortion numbered one in 1940, eight in 1941, four in 1942 and three in 1943.

The patient in 1940 on post-mortem examination was found to have an intact pregnancy of three months with considerable hæmorrhage between it and the uterine wall. This separation contained much soapy fluid. A crochet hook, enema and whirling spray had been used. Death was attributed to shock. This is a fair prototype of the technique employed in a number of abortions.

State of the Pregnancy.—The state of the pregnancy in these non-septic abortions was as follows: intact, nine; incomplete, seven.

Cause of Death.—The cause of death in the non-septic abortions was: shock and air embolism, eight cases; hæmorrhage, seven cases; toxæmia one case.

Comparison of Yearly Figures.

The yearly figures for abortion are set out for purposes of comparison in Table XIX.

TABLE XIX.

Year.	Number of Deaths Due to Abortion.
1940	39
1941	30
1942	37
1943	35

Preventible Deaths.

All criminal abortions are classed as preventible; but in some cases other avoidable factors were present. In the deaths from abortion other factors were noted in 56 cases: 21 in 1940, 11 in 1941, 2 in 1942 and 22 in 1943.

Blood Transfusions.

In 1940 thirteen patients were given blood transfusions. In 1941 ten patients were given blood transfusions. In 1942 twelve patients were given blood transfusions. In 1943 fourteen patients were given blood transfusions.

The total number of transfusions, 49, is encouraging. The committee has repeatedly drawn attention to the value of blood transfusion in making up blood loss and combating sepsis.

There is no doubt that the increasing enthusiasm of the individual doctor for transfusion and the extension of the mobile transfusion units represent an avenue of improvement in maternity services.

Age Distribution.

The age distribution of the patients who died from different types of abortion is set out in Table XX.

TABLE XX.

Age Group. (Years.)	Abortion with Infection.		Abortion Without Infection.	
	Spontaneous. (Cause 140a.)	Criminal. (Cause 140b.)	Spontaneous. (Cause 141a.)	Criminal. (Cause 141b.)
15 to 19..	0	8	0	1
20 to 24..	6	9	2	0
25 to 29..	7	29	3	2
30 to 34..	7	21	1	2
35 to 39..	10	15	1	2
40 to 44..	2	10	0	2
Over 45..	0	0	0	0
Total ..	33	92	7	9

Parity.

The parity of the 141 patients who died as a result of abortion was as follows: *multiparæ*, 73; *primiparæ*, 45; unspecified, 23.

Social State.

The social state of the 141 patients who died as a result of abortion was as follows: married, 90; single, 37; widowed, four; separated from husband, nine; unstated, one.

Other Factors.

The committee considered that the following factors influenced the fatal issue:

1. Late admission to hospital.

2. Lack of sufficient obstetrical and gynæcological facilities at the hospital.

3. Delay in obtaining medical advice.

4. Delay in admission to hospital subsequent to the obtaining of medical advice.

5. Choice of treatment. (*a*) Surgical—(i) finger, (ii) ovum forceps, (iii) curettage, (iv) uterine douching. (*b*) Non-surgical—(i) sulphonamide drugs, (ii) gas gangrene antiserum.

Conclusion.

The Special Medical Committee Investigating Maternal Mortality in Sydney presents this five year survey since the inception of the scheme for the reduction of maternal mortality in January, 1939.

The recent marked reduction in the maternal mortality rate in Britain should be possible in Australia, and the committee intends to present each year a clinical analysis of the findings in an endeavour to discover any means, such as improved or additional facilities, services, training *et cetera*, whereby this can be achieved.

Acknowledgements.

Special acknowledgement is due to Mr. W. J. Willcocks, of the Bureau of Statistics and Economics, who has assisted the committee in many ways since the inception of the scheme.

It is also desirable to make special mention of the work of the medical superintendents of the metropolitan obstetric hospitals, who have now arranged an almost automatic contact with this department for these investigations and reports. The Assistant Medical Officer, Division of Maternal and Baby Welfare (Dr. N. P. Banks), appointed in June, 1943, has made the inclusion of the 1943 histories possible by personally collecting the delayed case histories from doctors, hospitals *et cetera*, and other data, and so bringing the material up to date.

Every effort is now made to obtain, as soon as possible after the occurrence of death, information from the doctors, midwives or hospitals connected with the case. During the years 1941 and 1942 this was difficult because the war situation caused acute shortages of medical and clerical personnel and frequent alterations and additions to the responsibilities of the various members of the staffs concerned, also because of the transfer to war service of many medical practitioners. In spite of these difficulties the greatest cooperation has been extended to the Department of Public Health by the doctors and hospitals in the matter of details and particulars. The committee is sincerely appreciative of the attitude of helpfulness and interest displayed by the doctors in charge of many of the cases and by their excellent histories and subsequent inquiries.

Appendix III.[1]

Synopsis of Maternal Deaths Considered by the Special Medical Committee Investigating Maternal Mortality in 1939.

Of the 102 deaths classified as maternal deaths, the number regarded as preventible, including 41 abortions, was 75.

Preventible	34
Non-preventible	27
Abortions	41
	102

The primary avoidable factors were as follows:

(*a*) Error in judgement or management of the case by the doctor including failure to use reasonable facilities	15
(*b*) Fault of the patent by omission for irregular attendance for pre-natal care	10
(*c*) Inadequate pre-natal care on the part of the doctor	7
(*d*) Error in practice or pre-natal supervision by the nurse	2
Total	34

Total Number of Deaths Classified as Maternal Deaths Listed under the Various Causes for the Year 1939.

Cause.	Number of Deaths.	Preventible.	Non-Preventible.
Post-abortive sepsis	7	7	0
Criminal abortion	34	34	0
Ectopic gestation	4	1	3
Puerperal hæmorrhage	13	8	5
Puerperal septicæmia	11	11	0
Puerperal albuminuria and convulsions	13	9	4
Other toxæmias of pregnancy ..	7	1	6
Embolism and sudden death ..	2	0	2
Other accidents of childbirth—			
Cæsarean section	7	3	4
Shock	4	1	3
Totals	102	75	27

[1] Appendices I and II comprising the form on which information was supplied to the committee are omitted owing to limitation of space.

APPENDIX IV.

International List of Causes of Death as Adapted for Use in Australia.

(This Classification will be Used for Ten Years Commencing January 1, 1940.)

Class XI. Diseases of Pregnancy, Childbirth and the Puerperal State.[1]

140. Post-abortive[2] infection.
   (*a*) Spontaneous, therapeutic or unspecified.
   (*b*) Criminal abortion.
141. Abortion[2] without mention of septic conditions.
   (*a*) Spontaneous, therapeutic or unspecified.
   (*b*) Criminal abortion.
142. Ectopic gestation.[3]
143. Hæmorrhage of pregnancy.[3]
144. Toxæmias of pregnancy.[3]
   (*a*) Eclampsia of pregnancy.
   (*b*) Albuminuria and nephritis of pregnancy.
   (*c*) Acute yellow atrophy of liver associated with pregnancy.
   (*d*) Other toxæmias of pregnancy.
145. Other diseases and accidents of pregnancy.[3]
146. Hæmorrhage of childbirth and the puerperium.
147. Infection during childbirth and the puerperium.
   (*a*) Puerperal infections.
   (*b*) Puerperal thrombophlebitis.
   (*c*) Puerperal embolism and sudden death.
148. Puerperal toxæmias.
   (*a*) Puerperal eclampsia.
   (*b*) Puerperal albuminuria and nephritis.
   (*c*) Acute yellow atrophy of liver (post-partum).
   (*d*) Other puerperal toxæmias.
149. Other accidents of childbirth.
   (*a*) Cæsarean section.
   (*b*) Other surgical operations and instrumental delivery.
   (*c*) Others, obstetric shock.
150. Other or unspecified diseases of childbirth and the puerperium.
   (*a*) Puerperal diseases of the breast.
   (*b*) Others.

APPENDIX V.

Department of Public Health, Division of Maternal and Baby Welfare.

Memorandum from the Special Medical Committee Investigating Maternal Mortality.

Treatment of Post-Partum Hæmorrhage.

1. Control the bleeding.
2. Treat the patient.

Sometimes the bleeding is controlled, but the patient may die because of lack of treatment of blood loss and shock.

1. Control of Bleeding.

It is important to watch for, and recognize the danger of, small but persistent or repeated hæmorrhages before or after the delivery of the placenta. The presence of a piece of placenta in the uterus should be detected by the routine examination of the placenta which has previously come away.

If the Placenta is Still in the Uterus.

Methods used to control the hæmorrhage are as follows:

(1) Massage of the uterus.
(2) Expression of the placenta by the Dublin method.
(3) Manual removal of the placenta.
(4) Injection of ergometrine and/or pituitary extract.
(5) Hot intrauterine douche (115° to 120° F.) if the placenta has been manually removed.
(6) Abdominal compression of the uterus.
(7) Bimanual compression of the uterus.
(8) Packing the uterus.

[1] The puerperal period is here defined as the period of six weeks immediately following upon the expulsion of the product of conception; puerperal diseases are those originating in the female genital system during this period.

Delayed deaths from diseases which originated in the female genital system during pregnancy, childbirth or the puerperium as thus defined, should be included in this section regardless of the interval between delivery and death.

[2] The word "abortion" here means the expulsion of a non-viable product of conception—that is, occurring before seven months' (twenty-eight weeks') gestation.

[3] This heading is only to include deaths of women whilst still in the pregnant state (before the expulsion of the product of conception).

If the Hæmorrhage Occurs after the Placenta has been Delivered.

Methods used to control the hæmorrhage are as follows:

(1) Massage of the uterus.
(2) Abdominal compression of the uterus.
(3) Injection of ergometrine and/or pituitary extract.
(4) Bimanual compression of the uterus.
(5) Hot intrauterine douche (115° to 120° F.).
(6) Packing the uterus.

Expression of Placenta by the Dublin (Credé's) Method.

This is a very useful method provided it is not used too vigorously or too frequently. The amount of shock resulting from too vigorous or too frequent use of this method must always be borne in mind. The uterus is a very sensitive organ.

The Dublin method should be used as follows:

(*a*) Once or twice without an anæsthetic.

(*b*) With light anæsthesia prior to a manual removal. In other words, after failing to express the placenta without an anæsthetic, have your patient prepared for a manual removal and, with the patient under the anæsthetic, try once more the Dublin method.

Pituitary Extract and Ergometrine.

A syringe prepared for intramuscular injection and ampoules of one cubic centimetre of ergometrine and one cubic centimetre of pituitary extract should be ready to hand in all obstetric cases. Such preparation may save a few minutes' time and thus prevent the loss of quite a lot of blood.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association was held at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, on November 22, 1944, DR. J. N. CHESTERMAN, the chairman, in the chair.

Maternal Mortality in the Metropolitan Area of Sydney.

DR. GRACE J. CUTHBERT presented a report on the investigation of maternal mortality in the metropolitan area of Sydney carried out by the Special Medical Committee appointed by the Public Health Department of New South Wales (see page 688).

In her opening remarks Dr. Cuthbert thanked the Minister for Health for releasing the report to the British Medical Association for this meeting of the section and for THE MEDICAL JOURNAL OF AUSTRALIA.

Regrets were expressed at Professor Windeyer's absence owing to severe illness, at Dr. Morris's absence at the National Health and Medical Research Council at Canberra, as he had taken particular interest in the meetings throughout the time under survey and was the chairman of the committee, and also at Professor Mayes's absence at a special meeting in Canberra.

DR. A. J. GIBSON stated that the Special Medical Committee was desirous of helping all medical practitioners, specialists and general practitioners in their responsible work of obstetric practice. The committee was anxious to dispel any apprehension that medical practitioners might have that it was sitting as censor considering these cases. It was important, for the medical profession to understand that the committee was consistently sympathetic with those medical practitioners who had the misfortune to have a maternal death occurring in their practice. He was particularly anxious to convey to those doctors to whom the committee wrote after considering the death that the intention of the committee in such action was solely to bring before the notice of the doctors some particular aspect of the case which might enable them in future to overcome a similar difficulty.

Dr. Gibson referred to Table II and its record of a decreasing maternal death rate and pointed out that while this had decreased in the last few years, there still seemed to be considerable scope for further reduction, and in particular he felt that some further effort might be made in the question of reduction of stillbirths.

A very disturbing feature to the committee was the total number of deaths from hæmorrhage and toxæmia which might have been prevented. In his opinion there were still various types of effort which could be made to reduce these unfortunate totals.

Dr. Gibson wished to make a comment which he had been particularly asked by Professor Mayes to make, with which the committee agreed, that the histories of the patients who died were in many cases deplorable. The committee had taken great trouble in setting out the *questionnaire* so that sufficient information would be available for accurate conclusions to be drawn. It would appear that if improvements in maternal mortality were to be obtained, doctors must take more care in obtaining the history. He also emphasized the fact that in teaching hospitals this was an essential feature of the responsibilities of the doctors in charge. There seemed to be some particular difficulty concerning patients who were admitted as urgent cases.

With regard to hæmorrhage, it was obvious that too many lives were lost from post-partum hæmorrhage. Much more notice would need to be taken in the meantime of the third stage of labour.

In regard to sepsis, it had been noted that 27 of the deaths from sepsis followed normal labour. In contrast to this, manual removal of the placenta, which was considered to be one of the most dangerous operations in midwifery, had accounted only for nine. This comparison was drawn because it was noted that quite often the third stage of labour was not watched sufficiently carefully and often the patient was left until moribund before a manual removal was done. If proper precautions were taken it would appear that manual removal at an early stage would improve the patient's chances of survival.

It was necessary again to emphasize the fact that the evidence before the committee showed that proper bacteriological investigation was not made early enough and that lives of mothers would still be lost if the practice did not become general.

Finally, it could be concluded from the information before the committee that an increased number of beds in properly equipped hospitals was absolutely essential, and that patients should be admitted when required if the maternal mortality was to be reduced.

DAME CONSTANCE D'ARCY expressed appreciation of the report and was impressed with the fact that it was noteworthy for its lack of hostility. From its presentation of the material and conclusions, it was quite obvious that those engaged in the work had been through the mill and thoroughly understood the serious problems confronting obstetricians and general practitioners on many occasions.

Dame Constance D'Arcy stated that she was greatly disturbed at the inference that honorary medical officers were not called early enough to patients in public hospitals. She felt that this was an intramural matter which should be solved in each hospital so that no such difficulty would arise in the future. She further commented on the number of Cæsarean sections. Fifty-three deaths in this series reflected an opinion which Dr. Morris had expressed some years previously, that until fewer Cæsarean sections were performed it was unlikely that the maternal death rate could be lowered materially. With regard to the number of failed forceps recorded, Dame Constance D'Arcy felt that trial labour should no longer be undertaken with unsuccessful results; that modern methods of pelvic measurement with the assistance of highly skilled technique in X-ray work should obviate difficulties such as were experienced in the past.

In regard to hæmorrhage, it was quite obvious that blood transfusions had not been given in some cases early enough, and Dame Constance D'Arcy suggested that some inquiry might be made concerning the supply of blood plasma to some hospitals. With regard to the toxæmias, she pointed out once again the importance of having sufficient hospital beds, as this was the only method from which one could expect results in toxæmias such as eclampsia, hyperemesis *et cetera*.

DR. T. DIXON HUGHES thanked Dr. Cuthbert for the presentation of the report. He took issue with the committee in regard to its comment on hyperemesis; he felt that a red herring had been drawn across the trail and actually the main point missed: that the committee questioned the method of emptying the uterus rather than the question of allowing the patient to get into almost a moribund state before intervention. He thought that a better purpose would have been served by indicating the fundamental necessity of watching the rising pulse rate and the appearance of jaundice. As to the use of tents, their action was slow and uncertain. With regard to shock he was still of the opinion that there were many cases in which shock was the accurate diagnosis; there was no doubt that there were patients who suffered from a vasomotor collapse, particularly those who had had some previous elevation of blood pressure. Such cases had nothing whatever to do with ruptured uterus, hæmorrhage *et cetera*, as suggested by the report.

With reference to the toxæmias it would have been preferable if the committee had pointed out that the important matter in the estimation of blood pressure was the relative rise; this was much more important than a statement of the actual reading record at 140 millimetres of mercury *et cetera*.

Dr. Hughes differed from Dame Constance D'Arcy in that there was a long way to go before even the most modern X-ray technique could give sufficient information as to the size of the baby to be entirely reliable. He had previously checked many head measurements and had not been satisfied with their accuracy. He agreed, however, that X-ray examination was of the greatest aid, and the time should come when obstetricians would use forceps fully confident of 100% success based on X-ray evidence.

DR. DONOVAN FOY thanked Dr. Cuthbert for the presentation of the report and commented on the amount of detail and the resulting interest which the report afforded; he expressed his appreciation of the amount of work that must have been put into it. Even if it had been difficult to decide in some cases what was preventible or non-preventible, there was no doubt that very careful attention had been paid to each history, and the resultant finding was therefore the best that could be obtained. He further thought that the community should be more appreciative of the blood transfusion service and that it should be used to its utmost. Dr. Foy also spoke of the booklet "Healthy Motherhood", which was issued free by the Department of Public Health. He considered it to be a very fine effort, and the only comment he had to make was that he thought perhaps it laid too much stress on the mother being confined at home. Hospital, in his opinion, was the best place for confinements. With reference to the departmental clinics, he had only praise for the work that these clinics had done in the past. In referring to the findings of the committee, Dr. Foy said that it appeared that the percentage of non-preventible deaths had in a sense apparently been an act of God. He felt sure that the committee was satisfied that as far as it could ascertain, proper care and attention had been given. In the non-preventible cases Dr. Foy stated that it was intensely hard to criticize the management of obstetric work unless one was actually there, but the experienced people who were on the committee had undoubtedly made every allowance for the difficult circumstances that might exist. One of the highlights of the report was that it was quite obvious that the rate of mortality from toxæmias was much too high. In his opinion the only remedy for this was ample provision of hospital accommodation for all patients classified as toxic.

If the State Government was unable to provide these facilities the Federal Government should take up the question. It was obvious that maternal and infant welfare was a Federal matter because it was a national problem.

Dr. Foy thought that this matter of obstetric problems was one which should belong to the profession in general, and there should be open meetings and full discussion of obstetric problems as they existed.

It was appreciated by the community and by doctors in particular that during the last three or four years there had been unusual and extraordinary difficulties to face, and every obstetrician or general practitioner who was engaged in obstetric practice would be very conscious of the fact that the strain under which mothers were living had contributed in certain cases to the fatal issue. It was also realized that doctors were working for long hours when lack of sleep and fatigue must influence the sharpness and correctness of judgement. This applied to obstetricians as well as general practitioners, and there was no doubt that in wartime tragedies did occur because of the particular difficulties which all doctors were experiencing.

DR. A. M. DAVIDSON thought that as a matter of historical interest the meeting should know how the scheme for reduction of maternal mortality came into being. Dr. Alfred Gibson, while a member of the Council of the New South Wales Branch of the British Medical Association, suggested that a subcommittee of that body should be formed to consider the question of the high rate of maternal mortality. The Council agreed and a representative committee was formed of which the Director-General of Public Health was a member and Dr. Alfred Gibson was the chairman.

This committee was of the opinion that the scheme now in being should be inaugurated, and as a result of the cooperation between the New South Wales Branch and the Department of Public Health, thanks to the liberal views of Dr. E. S. Morris, the suggestions of the committee were accepted and the Special Medical Committee organized by the Department of Public Health, as mentioned in the report, commenced its duties in January, 1939.

There was no doubt that the work of the committee was an example of the very happy cooperation between full-time public health officers, Dr. Morris and Dr. Cuthbert, and teachers of the student teaching hospitals, the Professor and Emeritus Professor of Obstetrics and the general practitioners. Dr. Davidson stated that he had been intensely interested in the work of the committee since the New South Wales Branch had appointed him to represent the general practitioners, and he was fully aware of the attitude of the committee, which was to assist in any way to improve maternity services by helping either the doctors concerned or the hospital authorities. He had been particularly struck by the necessity for prompt intravenous medication in cases of hæmorrhage and the need for early bacteriological investigation in cases of infection, the main practical difficulty being that of transporting specimens to 93, Macquarie Street.

Dr. Davidson supported the contention in the report that resident medical officers, although keen, interested and well informed, did on occasions take far too much responsibility without at the same time informing and consulting the honorary medical officers.

Finally, he would like to comment on the collaboration with the statistician. Many cases had been referred by the statistician to the committee, and the question of alteration of the grouping of the cause of death in some cases had been discussed with him, and quite recently an altered practice had come into being for Australia with reference to the group of causes including Cæsarean section. At times certain matters had been taken up with the statisticians in other States; and thus a general improvement in the standard of vital statistics throughout the Commonwealth was being made possible by the work of the committee.

DR. BRUCE WILLIAMS expressed his appreciation of the report and considered it to be extremely valuable and full of useful information. He felt that if the committee had achieved nothing but the general acceptance of albuminuria as a late sign in toxæmias of pregnancy and of high blood pressure and increased weight as an early sign, this alone would have been a very considerable contribution, in addition to the fact that chloroform should not be used in cases of toxæmia. Moreover, the emphasis on the fact that any hæmorrhage during the last three months of pregnancy was of serious significance, was important.

He was glad to note that the committee had also stated clearly that a patient should not be examined *per vaginam* in her own home in these circumstances. Finally, he would like to congratulate the Women's Hospital, Crown Street, on its maintenance of the mobile blood transfusion unit for the last six years.

DR. R. F. BACK expressed his appreciation of Dr. Cuthbert's presentation of the report and was struck with the undue proportion of maternal and fœtal deaths from toxæmia. He was impressed with the fact that the committee made such definite statements on their observations of the results which could be obtained from careful prenatal care. He was of the opinion that the memorandum on post-partum hæmorrhage had been most valuable and most welcome to all general practitioners, and he suggested that the committee might feel prepared to ask the Director-General to circulate a similar memorandum on pre-natal care. Dr. Back stated that a special difficulty existed in the question of termination of pregnancy. It was well known that the present methods of termination of pregnancy were unsatisfactory because they were a great strain on the mother and were even unsuccessful and had to be repeated. He thought that special attention should be given to more appropriate methods of inducing labour in accidental hæmorrhage and toxæmias. Dr. Back was of the opinion that only in public hospitals and institutions where there was satisfactory equipment could toxæmic patients be successfully treated. The time was fast approaching when the general practitioner, who on the whole had no special training in obstetric practice, would consider his duty was ended when abnormalities were detected, and would refer the patient to either a public hospital or an obstetric specialist.

DR. CLEMENT CHAPMAN stated that man was a microcosm and that human interference could not control the incidence of all cases of post-partum hæmorrhage and infection, but there was no doubt that attention to the nutritional aspect of obstetric practice had been too long neglected; a woman with insufficient intake of milk and subsequent lack of calcium and insufficient intake of orange juice and fresh vegetables would obviously be seriously lacking in essential food elements. Dr. Chapman considered the report to be very valuable and a contribution to improvement in obstetric practice.

DR. G. L. HOWE expressed appreciation of the report and was convinced that further recommendations on the preventive aspect would be most welcome by the profession. He was quite certain that less than 25% of general practitioners recorded the weights of their obstetric patients, and he knew of one metropolitan hospital which did not do so. Dr. Howe hoped that if general practitioners were prepared to record weights of their obstetric patients, scales could be made available to them, as he knew that difficulty existed in obtaining them just now. He fully supported the contention that unless sufficient obstetric beds were made available to the general practitioners and obstetricians for the admission of toxæmic patients, no improvement would take place. Unless one could assure a hospital that a patient's condition was an urgent one, any request for admission for subacute cases was refused. In regard to infection, Dr. Howe was of the opinion that the Department of Public Health should alter the regulations under the *Nurses' Registration Act* to be stricter than they were at present. He suggested that regulations should be implemented in which it was obligatory to take a swabbing of the lochia and the throat of the patient, and the throat of the nurse in all obstetric cases when the patient had a temperature of 100·4° F. on the first occasion, not on the second as it was at present. He agreed with Dr. Foy that there was no doubt that the general weariness and fatigue of doctors at the present time would probably decrease the acuteness of their judgement. In his opinion post-graduate work was done only by good general practitioners, and it was not often that those who were not interested would undertake post-graduate work. He was of the opinion that the pamphlets and memoranda issued by the Department of Public Health had been so helpful that a quarterly obstetric bulletin might be issued by the committee presenting its most important findings. He thought that if this was put in the form of a personal letter and circulated to the medical practitioners it would be more likely to be read than if it was only reported in the journal.

DR. P. L. HIPSLEY expressed appreciation of the presentation of the report and the work of the Special Medical Committee. Listening to the discussion, he thought that one was apt to forget that 95% of obstetric cases were normal and that a number of women would deliver their babies safely even in the jungle. He recalled the fact that thirty years previously, when the great majority of midwifery work was done in the home, there had been little sepsis, whereas in a hospital it was so easy to contact the hæmolytic streptococcus. He stressed the danger of cross infection in hospital. In his opinion, as far as sepsis was concerned, it was prevention and not treatment which was so important. He noticed, too, as years went by, that doctors who became better known and more popular, eventually took on more work than one doctor could give sufficient personal attention to. He was of the opinion that although at the moment the patient-doctor relationship was being continually stressed, if a group of obstetricians or general practitioners—say four or five—were to undertake midwifery, making it clear to the mother concerned that she would have the attention of her own particular doctor at the time of her confinement if circumstances permitted, he was perfectly certain that if she attended regularly for pre-natal care and gained some knowledge of the individual doctors of the group, she would not at the time of her confinement really mind very much which one of the group confined her.

DR. J. N. CHESTERMAN, from the chair, stated that he would refrain from extending the discussion owing to the lateness of the hour, but he would like to express appreciation to Dr. Cuthbert for presenting the report and to the committee for the valuable work which had been done. In his opinion discussions such as had taken place encouraged everyone to face the problems which the committee had investigated and presented; there was no doubt that the discussion should influence the standard of obstetric practice and therefore lower maternal mortality.

In replying on behalf of the committee, Dr. Cuthbert referred briefly to some of the points which had been taken up. She spoke first of Dr. Gibson's point that there should be an increased number of beds in properly equipped hospitals.

Dr. Cuthbert pointed out that although the *Private Hospital Act* was very effective, it still had no direct control over the standard of equipment of the hospital, although the *Nurses' Registration Act* had control over the equipment of midwives' bags.

In reply to Dame Constance D'Arcy concerning the assumption of too much control by resident medical officers, Dr. Cuthbert thought that this had been made quite clear to the committee in the answers to the *questionnaires* sent out, and she fully agreed that this was an intramural matter which could be solved quite readily.

In reply to Dr. Hughes, there was no doubt that the committee could have stated the case for the care of hyperemesis more fully. It was, however, difficult to know just how to restrict the report, as it was not intended to be an obstetric treatise. Dr. Cuthbert also pointed out that with regard to shock there was no doubt that there were still many mothers who did die from obstetric shock, but there were cases in which the diagnosis was inapt. With reference to the comment on the relative rise of blood pressure, there was no doubt that this point could have been made clearer in the report as it was quite obvious that this was one of the fundamental points in the statement the committee had made. In the experience of the medical officers and practising obstetricians who had undertaken the care of departmental clinics, the average blood pressure reading of the mother under thirty-five years of age was between 110 and 115 millimetres of mercury, and it was on this type of basis that the figure stated had been made.

Dr. Cuthbert was interested in Dr. Foy's reference to the "Healthy Motherhood" book and its section on confinement in the home, and would take up this point. With regard to nutrition there had been a subsection on nutrition which had been enlarged for the new edition to be published shortly, and in all *questionnaires* a detailed inquiry was made concerning the type of diet on which the mother lived during pregnancy.

Dr. Cuthbert stated that she was interested to know that the general practitioners approved of and found useful the memoranda which had been circulated, and finally wished to thank the members of the Special Medical Committee who had each assisted her in many ways and had always been helpful in the task of bringing out the survey.

VICTORIAN BRANCH NEWS.

THE following is the result of the ballot for the election of members of the Council of the Victorian Branch of the British Medical Association and the Committee of the Medical Society of Victoria for the year 1945, together with the votes polled.

Dr. Robert Southby	324
Dr. John S. Green	321
Dr. H. C. Colville	319
Dr. John Dale	298
Dr. F. Kingsley Norris	296
Dr. D. M. Embelton	292
Professor P. MacCallum	291
Dr. C. Byrne	271
Dr. Euan I. Littlejohn	269
Dr. J. H. Gowland	256
Dr. L. W. Johnston	249
Dr. Kenneth Smith	218
Dr. Douglas Thomas	214
Dr. A. Brown	203
Dr. A. McCutcheon	182
Dr. E. M. Ettelson	177
Dr. N. L. Speirs	154
Dr. W. L. Carrington	136
Dr. Arthur J. Day	104
Dr. W. T. Greening	84
Dr. J. E. Cockerill	73
Dr. M. Ashkenasy	70
Dr. J. H. Dorman	57

Three hundred and fifty votes were polled, three being informal.

Correspondence.

OPERATIONS FOR ACUTE MASTOIDITIS.

SIR: I am delighted to see another report, this time by Walter Crosse and L. T. Jobbins, on ten cases of mastoiditis, following upon that by Hutcheon published recently. In each series of cases, a serious attempt (successful) has been made to exclude secondary infection, thereby allowing healing to take place in the minimum length of time. My only objection is to the fact that these surgeons have given free advertisement to proprietary preparations. There has been far too much of this in medical literature of late. There is a large number of drugs available to chose from which would have produced the same results which are, I believe, not proprietary. For example, double cyanide of mercury and zinc, proflavine, double cyanide gauze moistened with acriflavine solution, moist carbolic gauze, unless surgeons still have fear in using it. All of these, applied intelligently, will guard any wound against secondary infection and the wound then will look after itself in nature's own inimitable way.

Yours, etc.,

A. C. F. HALFORD, M.D.

Wickham House,
Brisbane,
December 14, 1944.

THE REPATRIATION DEPARTMENT AND EX-SERVICE PERSONNEL.

SIR: I refer to a letter from Dr. D. R. W. Cowan, of Adelaide, appearing in the journal of November 25, 1944, and published under the heading "Repatriation Department and Ex-Service Personnel".

1. The statements in this letter in regard to the standards for diagnosis in respect of pulmonary tuberculosis in service and ex-service personnel are incorrect. The medical officers and consultants of the Repatriation Department are just as well informed and alive to the problems of diagnosis of this disease as Dr. Cowan.

2. In view, however, of the wide public circulation of THE MEDICAL JOURNAL OF AUSTRALIA, it is necessary to request that you should publish this reply.

3. It is not, nor has it ever been, the policy of the Repatriation Department to insist on the demonstration of tubercle bacilli in the sputum, gastric contents or pleural fluid before making a diagnosis of pulmonary tuberculosis.

4. One is indeed astonished, Mr. Editor, that you should think fit to publish such a letter in a journal with the standing and reputation of THE MEDICAL JOURNAL OF AUSTRALIA without taking any steps to ascertain the true position.

Yours, etc.,

KENNETH SMITH,
Principal Medical Officer.

Repatriation Commission,
314 Collins Street,
Melbourne, C.1.
November 29, 1944.

MUSCLE AS A HÆMOSTATIC.

SIR: In the journal of December 2 Lambert Rogers brings up the question of the use of muscle as a hæmostatic. I can throw some light on the history of this procedure.

I was in London in 1909 and I called at Victor Horsley's house to ask him about an operation that I had been doing on children with infantile paralysis. I used to take and cut a sound nerve half-way through, then slit it up the centre, and then draw the free piece of sound nerve over and graft it into the nerve affected by the infantile paralysis, in the hope that the axis cylinders of the good nerve would grow down the affected nerve, and by this means a nerve impulse might be sent to the muscles supplied by the affected nerves.

Horsley thought that it was worth going on with, but said that he himself never saw a case of infantile paralysis; all his work was on the brain, but as I was going to America he would give me a letter to Cushing and I should discuss the idea with him. Horsley then asked me to his brain operations every day, and on one occasion he directed my attention to a method he had of stopping bleeding by holding a piece of fresh muscle for a minute on the bleeding point. He said that he had found this out by mere chance.

When I got to America I went to see Bradford, the great orthopædic man in New York, and I discussed the nerve operation with him. He exclaimed: "I have six cases in my wards and I will try it at once; it might turn out well."

Then I moved on to the Johns Hopkins and, with my letter from Horsley, saw Cushing. He asked me to dinner and he said that he had no theoretical objections to offer and strongly advised me to continue the operation. I made him laugh when I said that I had bought several cigar piercers and I proposed to pierce the affected nerves with the sharp piercer and then introduce the piece of good nerve into the hole left when I withdrew the piercer. If I could not get the nerve in I would put a thin thread of catgut through the end and put the needle down the hole, and push the needle out of the affected nerve, and so draw the good nerve into the hole in the affected nerve where a very thin piece of gut would fix it.

After dinner we were talking shop and I told him what Horsley had told me about stopping the oozing from a blood vessel by applying a piece of fresh muscle, and he was very intrigued and said he would try the dodge at the first opportunity.

And so I can say definitely that Victor Horsley was using the plan in the middle of the year 1909 and that Cushing knew nothing about it before I mentioned it to him; so Victor Horsley must be given the credit for the procedure. Horsley certainly did not say that he had got the idea from anyone else; he rather implied that he had hit on the plan by chance.

Poor old Horsley was a fanatic about alcohol, so at lunch on the first day that I visited him, to my surprise a large cup of tea was put down by my plate. I never touched it, and at last he said: "I see you are not drinking your tea." I replied with a smile that I never drank tea; but if we had no tea in Australia we would have no patients.

A look of surprise came into his face, which, however, turned to horror when I informed him that whisky and soda was my usual drink. He had to leave, as he had a consultation on a brain case, and when he was gone Lady Horsley burst out laughing and said: "Don't take any notice of dear Victor, he has a mania about drinking alcohol."

After lunch Lady Horsley took me into a sitting room where there was a large book, and she explained that Victor asked all his visitors to write their opinion about drinking alcohol in any form. She asked me to write mine, so I wrote: "If you don't want alcohol to get the best of you, get the *best* of alcohol."

Yours, etc.,

STEWART MCKAY.

Lismore,
New South Wales,
Undated.

The Royal Australasian College of Physicians.

EXAMINATION FOR MEMBERSHIP.

AN examination for membership of the Royal Australasian College of Physicians will be held in April and May, 1945. The written examination will be held in capital cities where candidates are offering and, for the convenience of candidates serving in the forces, at other centres if the necessary arrangements can be made. The clinical examination will be held in Sydney and Melbourne, provided a sufficient number of candidates is offering in both places.

Only those candidates whose answers in the written examination have attained a standard satisfactory to the Board of Censors will be allowed to proceed to the clinical examination. A booklet entitled "Notes for the Guidance of Candidates", which contains further details referable to the examination, will be posted on application to the Honorary Secretary of the College.

The dates fixed for the examination are as follow:

Written examination: Saturday, April 14, 1945.

Clinical examination in Sydney: Friday and Saturday, May 4 and 5, 1945.

Clinical examination in Melbourne: Tuesday, Wednesday and Thursday, May 8, 9 and 10, 1945.

Applications to appear before the Board of Censors should be made in the prescribed form and must be in the hands of the Honorary Secretary of the College not later than Saturday, March 3, 1945.

Application forms are obtainable from the Honorary Secretary, 145, Macquarie Street, Sydney.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Hume, Kevin Francis Hamilton, M.B., B.S., 1942 (Univ. Sydney), 155, Oberon Street, Coogee.

Obituary.

JOHN LOUIS DEARBERG.

WE regret to announce the death of Dr. John Louis Dearberg, which occurred on December 18, 1944, at Randwick, New South Wales.

Books Received.

"People at Work: A Digest of Business and Industrial Psychology", published by the Australian Institute of Industrial Psychology; 1944. Sydney: Angus and Robertson. 9½" × 6", pp. 72, with illustrations. Price: 2s. 6d.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

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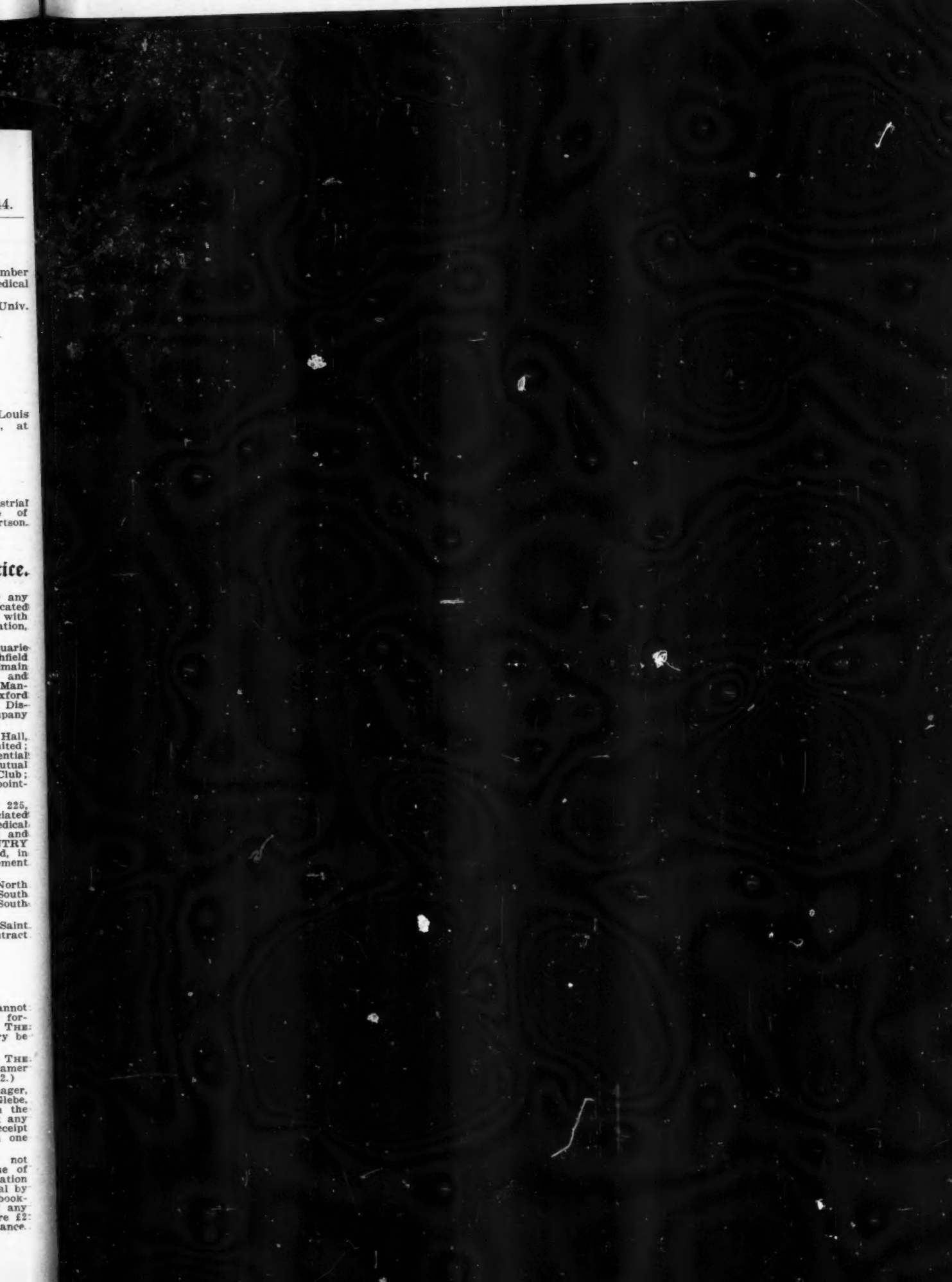

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